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HEALTH RISK APPRAISAL AND HEALTH PROMOTION BEHAVIOR IN YOUNG ADULTS

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HEALTH RISK APPRAISAL AND HEALTH PROMOTION BEHAVIOR IN YOUNG ADULTS

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Abstract

HEALTH RISK APPRAISAL AND HEALTH PROMOTION BEHAVIOR IN YOUNG ADULTS

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Health Risk Appriaisal (HRA) is gaining widespread popularity as a health promotion strategy. Yet there are limited studies to date to assess the impact of HRA on health behavior, particularly among young populations. The purpose of this investigation was to determine the effectiveness of individual HRA results as a stimulus for young adults to pursue health promoting behavior. It was hypothesized that young adults exposed to the results of their personal HRA would demonstrate a significantly higher health habits change score than would young adults given the HRA, but not exposed to its results.

A pretest-posttest, control group design was used for the study. Thirty-six young adult volunteers ages 23 to 38 were randomly assigned to either the control or the treatment group. An investigator-designed Personal Health Habits Questionnaire (PHHQ) and HRA were completed by all subjects

at an initial group meeting. The HRA questionnaires were then submitted to the Center for Disease Control - Atlanta for computer processing. At a second meeting for experimental subjects only, individual risk appraisals were distributed and guidelines for interpretation given. Six weeks later, at a third and final group meeting, the PHHQ was completed again by all subjects. Thirty subjects completed the study.

PHHQ pretest to posttest behavior change scores revealed a significant positive change in the experimental group's health behavior as compared with control subjects (Student's T Distribution, $p \leq .05$). The greatest degree of positive health behavior change was seen in the areas of seatbelt usage, breakfast habits, and achievement of desirable weight for body height and frame in that order. Chi square analysis revealed that experimental subjects maintained a significantly higher proportion of positive health behavior than those who did not receive their HRA results ($p \leq .05$).

The generalizability of these findings is limited by the study's small sample size. However, HRA does seem to be a viable strategy for group health promotion activities in nursing practice. Replications of this investigation with larger probability samples are needed. Further study of educational and environmental interventions to enhance and sustain the impact of HRA on health behavior is also needed to develop a scientific basis for individual, group, and community nursing interventions concerned with

primary prevention.

Chapter 1

INTRODUCTION

Health promotion and illness prevention are concepts gaining increasing interest and attention in the health care field today. Milio (1976, p. 435) attributes this trend in part to the growing recognition of limitations that historic and contemporary medical care has had on improving the health of populations. McKeown (1979) further explores the limitations of medical measures and concludes that "the contribution of clinical medicine to the prevention of death and increase in expectation of life in the past three centuries was smaller than that of other influences" (p. 91). Instead, he recognizes the major determinants of health as the external environment and personal behavior (p. 118).

In the first U.S. Surgeon General's report ever to be released on the subject of health promotion and disease prevention, the continued trend of improved health in the American population since 1900 is cited (U.S. DHEW, 1979a, pp. 3-6). This positive trend in the health status of Americans is credited to earlier preventive efforts such as improved housing, sanitation, and immunization. But,

the report also recognizes that "...some of the recent gains are due to measures people have taken to help themselves - changes in lifestyles resulting from a growing awareness of the impact of certain habits on health" (U.S. DHEW, 1979a, p. 6).

During the early part of the century infectious disease and acute illness were the major causes of mortality. Dingle (1973) cites improved environmental sanitation, housing, clothing and nutrition starting in the mid-nineteenth century as the reason these problems began to diminish in the early twentieth century. Advances in medical care also have led to improved treatment with resulting declines in death rates from acute problems. Conversely, mortality rates from chronic health problems have risen (Ardell and Newman, 1977, pp. 101-102). Chronic diseases have become the major killers and causes of disability in today's society. Seventy-five per cent of all deaths in the U.S. today are due to problems such as heart disease, stroke, and cancer. Accidents also claim their toll on the population, being cited as the most frequent causes of death for those in the one to forty age group (U.S. DHEW, 1979a, p. 3).

These changing trends in morbidity and mortality require a reordering of primary prevention priorities. Here, primary prevention, which encompasses health promotion and disease prevention strategies, is contrasted to the aims of secondary and tertiary levels of prevention. These levels respectively focus on the prevention of complications from

disease and the limitation of disability when residual damage is present. As Kane (1974) states,

> Unfortunately, the diseases of today may not be as amenable to the interventions of primary prevention as were infections such as malaria and tuberculosis. Enmeshed in multifactorial matrices of causes and interactions, the control of present day chronic diseases appears to demand major behavioral changes at both individual and societal levels. No simple injection exists for the control of chronic degenerative diseases. We are aware of a variety of risk factors which, if brought under control, might reduce or eliminate the ravages of a variety of health problems, but we have not yet found the means of acting effectively against them (p. 125).

Concern over the rising costs of medical care has also triggered an interest in disease prevention (Milio, p. 435). Health care costs are rising faster than any other segment of the economy and are contributing much as a strong inflationary force (Saward and Sorenson, 1978, p. 890). Presently the U.S. spends $1 of every $12 of the gross national product for health care (Culliton, 1978, p. 883). As Saward and Sorenson (1978) state, "When viewed from an economical perspective, it would appear that in curative medicine we are spending more and more for less and less improvement" (p. 889). On the other hand, prevention used as an effective intervention in the disease process leads to an enormous savings, not only in cost of care, but also in preserving years of individual productivity that would otherwise be lost (Kane, p. 123).

Thus, the state of affairs in the health care system today is best summarized by the thesis of the Surgeon General's Report of Disease Prevention and Health Promotion

(U.S., DHEW, 1979a). It proposes that "...further improvements in the health of the American people can and will be achieved -- not alone through increased medical care and greater health expenditures -- but through a renewed national commitment to efforts designed to prevent disease and to promote health" (p. 3). Individual action and decision-making activities of public and private sectors are therefore designated as the key to risk reduction and subsequent health promotion for Americans (U.S., DHEW, 1979a, p. 10).

Paralleling the developments in primary prevention over the past few years, there has also been a heightened interest in public health education activities aimed at areas of prevention requiring individual action. The Surgeon General's Office cites the need for only modest changes in lifestyle to reduce risk substantially for several diseases (U.S., DHEW, 1979a, p. 3). Smoking cessation, reducing abuse of alcohol and drugs, stress control, improved nutrition, and exercise and fitness are recommended as general prevention strategies related to health promotion (U.S., DHEW, 1979a, p. 41). But the key to health risk reduction lies in individual motivation to pursue lifestyle changes, and this is difficult to generate in the asymptomatic individual. It is recognized that "people are not strongly inclined to act against something that they think will affect them in the distant future, if at all" (Colburn and Baker, 1973, p. 490).

Health Risk Appraisal (HRA) is a technique designed to

aid in an assessment of individual health risk factors by compiling and evaluating data on a person's age, gender, medical history, and health-related behavior. The appraisal results demonstrate the quantitative and interactive nature of risk-taking behavior and illustrate the personal relevancy and immediacy of risks to health. Finally, the HRA designates priorities for, and gives direction to, a personal risk behavior intervention program. For these reasons, it has been cited as an important motivational tool in risk behavior reduction (Kane, p. 131).

Statement of the Problem

The purpose of this study was to assess the effectiveness of the HRA (Appendix A) as a preventive health education and motivational tool for individuals to pursue self-care behaviors. The research question was: What effect does exposure to the results of the HRA have on young adult health promotion behavior?

Rationale

It is recognized that the beginnings of many adult chronic diseases are rooted in the health practices of early life. Health promotion and disease prevention must be regarded as lifelong concerns (U.S., DHEW, 1979a, p. 16). Along with childhood, adolescence and young adulthood have been cited as critical periods for establishing healthful behavior (U.S., DHEW, 1979b, p. 19). Having formed an

identity in the stage of adolescence, the young adult begins to deal with increasing levels of personal independence and self-sufficiency. Thus, young adulthood becomes an important period for counseling regarding health risks with an emphasis on self-responsibility for disease prevention and health promotion. As Bruhn and Cordova (1978) state, "...this is an important point in the life cycle for choices to be made about lifestyle and personal priorities. The behavior patterns which an individual feels comfortable with in young adulthood will be difficult, and in some instances impossible, to modify in later stages of life" (p. 18).

During a time when improved medical care has led to a decreasing morbidity and mortality among all other age groups, it is also disturbing to note that the death rate among American adolescents and young adults is rising sharply. Between 1960-78 the overall mortality rate for Americans dropped by 20%. However, it increased by 11% for 15-24 year-olds. These increases have largely been attributed to psychiatric problems, alcohol and drug abuse (Richmond Times-Dispatch, 1980). They further validate the need for preventive health research with young adults.

The use of the HRA as a tool for risk reduction education and health promotion motivation has been discussed. Yet its ultimate value as a predictive or motivational tool has not been fully tested and requires additional research (Colburn and Baker, 1973; Goetz, Duff, and Bernstein, 1980).

In her work with the HRA, Davis (1979) also cites the need for further investigation "...to determine if the Health Hazard [now Risk] Appraisal is an effective cue for the individual to assume responsible health behavior" (p. 67).

Hypothesis

Young adults who are exposed to the results of their personal HRA will demonstrate a significantly higher health habits change score than young adults who are given the HRA but not exposed to its results.

Definition of Terms

Health Risk Appraisal

The Health Risk Appraisal is a data collection and evaluation tool which utilizes information about a person's age, gender, medical history, and health behavior to develop a perspective of their health risks and the immediacy of impact to their health. The tool provides individuals with estimates of their greatest risks to survival over the next ten years of life. It also projects what the personal risk profile for age 40 would be if the same health behavior were maintained. These projections are based on reports in the medical literature, epidemiological investigations, and recent U.S. mortality statistics as discussed in Chapter 3. In this investigation the U.S. Department of Health and Human Services, Center for Disease Control Health Risk Appraisal was used (Appendix A).

Exposure to the Results of the Health Risk Appraisal

Exposure refers to the presentation and explanation of the computerized HRA analysis to study participants after completion of the HRA questionnaire. This included a verbal explanation of the HRA printout following CDC guidelines and presentation of written interpretation guidelines.

Young Adults

Young adults in this study included males and females ages 23-38.

Health Habits Change Score

The health habits change score is derived by comparing responses to the investigator-designed Personal Health Habits Questionnaire (PHHQ) at two points in time. This score reflects adoption of or continued engagement in specific health practices believed to reduce the probability of premature illness or disability. For the purposes of this study, these health behaviors included the achievement or maintenance of:

- moderate weight for height
- moderate levels of regular exercise
- moderate levels of alcohol consumption
- cigarette smoking reduction/cessation
- a daily nutritional pattern including breakfast and minimizing snacks
- seven to eight hours of sleep per 24 hours
- seatbelt usage at least 75% of the time spent as an automobile driver/passenger
- stress management skills

Assumptions

The major assumption underlying this study was that a potential exists for increasing health promotion behavior among young adults.

Limitations

The limitations of this study were:

1. Generalization of the results to the larger population was not possible due to the unrepresentative nature of the sample size.

2. The reliability and validity of the HRA has not been determined.

Delimitations

The delimitations of this study were:

1. The subjects were without known apparent significant physical or mental health problems.

2. The subjects were between the ages of 23 and 38.

3. The subjects spoke English and read at the sixth grade level or above.

4. Long term effects of the HRA on health behavior were not measured.

Methodology

The investigation was carried out using a pre-posttest control group design as follows:

$$\begin{array}{lll} R: & O_1 \quad X & O_2 \\ \hline R: & O_3 & O_4 \end{array}$$

where: R = randomization
O = observation
X = experimental variable

Thirty-six subjects were randomly assigned to the experimental or control group, and all participants completed a Personal Health Habits Questionnaire (PHHQ) (Appendix B) and HRA questionnaire during the initial session of the study (O_1, O_3). During the second session, experimental subjects were exposed to the results of their HRA (X). Six weeks later a final session was held and all participants completed the PHHQ (pre-posttest) again (O_2, O_4).

Volunteers from the young adult groups of two Richmond, Virginia United Methodist churches and their friends participated in this study. All three sessions were held in the fellowship hall of one of these churches.

Analysis of Data

A health habits change score was derived for each participant in the investigation. The t-Test for independent groups was then used to compare the experimental and control groups' mean health habits change score. Finally, an analysis of change scores for particular items on the PHHQ was made to gain further insights into the data.

Chapter 2

CONCEPTUAL FRAMEWORK AND REVIEW OF THE LITERATURE

Conceptual Framework

The conceptual framework for this investigation is rooted in the Self-Care theory of nursing developed by Dorothea Orem. Self-care is defined as "the practice of activities that individuals personally initiate and perform on their own behalf in maintaining life, health, and well-being'(Orem, 1980, p. 35). It is characterized as learned and deliberate behavior which is both positive and practical. "Performing a self-care measure involves a decision, a choice...there is need for reflection about what should be done and how it will be done. Knowledge of human functioning, one's present condition and circumstances, and techniques of care provides a basis for such reflections" (p. 40). The existence of individual limitations to engage in self-care activities are recognized in Orem's framework. Those limitations related to health substantiate the need for nursing.

Nursing is defined as an assisting art involving "... the complex ability to accomplish or to contribute to the accomplishment of the patient's usual and therapeutic self-care by compensating for or aiding the patient in overcoming the conditions or disabilities that cause him to (1) be unable to act for himself, (2) refrain from acting

himself, or (3) act ineffectively in caring for himself" (p. 125-26). Nursing assistance may involve any one, or combination, of the following activities: Acting for or doing for another, guiding another, supporting another, providing an environment that promotes personal development in relation to becoming able to meet present or future demands for action, and teaching another (p. 61).

With the personal responsibility inherent in health promotion and illness prevention, the self-care focus is most appropriate. Nursing assistance with these personal programs of primary prevention is rendered primarily through supportive and teaching activities as well as through the provision of a developmental environment (such as exposure to the Health Risk Appraisal results). In fact, Orem addresses the topic of hazards to life and well-being in her framework and categorizes them into those involving physical force, acts of nature, natural environments, self-produced risks, social and economical conditions, and faulty interpersonal relationships (p. 46).

Orem's framework further develops the role of nursing in primary prevention as it relates to self-care. Here, nurses collect data about the patient, the environment, and the patient's lifestyle. This information is a basis for assessing the self-care needs an individual has at the level of primary prevention. As she explains, "Nurses assist patients in health-care directed to the goals of health maintenance and promotion and disease prevention with an

awareness of the essential role of the patient or responsible adult in the continuous provision of this level of preventive health care" (Orem, p. 134).

The deliberate nature of self-care action involves two phases. First, decisions about self-care must be made. Secondly, actions to accomplish self-care must be carried out. Again, the health promotion focus in nursing with utilization of the HRA can be readily incorporated into this framework. In order to make decisions about self-care, awareness of reality (as provided by exposure to the HRA results) is required. This action then requires the ability to initiate and persevere to achieve desired results (such as reducing risk behaviors to promote better health).

The concepts of health promotion and disease prevention have been alluded to in this discussion, and also formulate an integral part of this investigation's conceptual framework. In a framework for prevention established by the then Department of Health, Education and Welfare (now Health and Human Services) Task Force on Prevention in 1978, lifestyles, environment and services were cited as the three key components of preventive efforts. All are influences on health with the first two areas classifying risk factors which influence individual health status (U.S. DHEW, 1978). Lifestyle is defined as health-related behavior and acts as a determinant of a person's health status. The environment can serve as a setting for the deployment of positive efforts to protect health. It also includes sources of hazard

external to the individual which increase the risk of health problems. The third component of this preventive framework, services, represents individual or population-oriented services through which the incidence or course of preventable diseases and conditions are influenced.

An additional component to be considered in this preventive framework is the concept of human biology which includes genetic predispositions to disease (Ardell and Newman, 1977, p. 101). Inherited tendencies for a wide variety of disease states have been cited in the medical literature. In individuals with these predispositions, modification of other risk factors contributing to these disease states becomes an important preventive thrust.

Health promotion, on the other hand, is aimed at maximizing an individual's potential for high level wellness. Health becomes more than the mere absence of disease and is recognized as a "dynamic state of being", "intended to express a set of principles for living an integrated life" (Ardell and Newman, p. 104). The goal of health promotion, high level wellness, is defined by Dunn as "an integrated method of functioning which is oriented toward maximizing the potential of which the individual is capable, within the environment where he is functioning"(Dunn, 1959, p. 447).

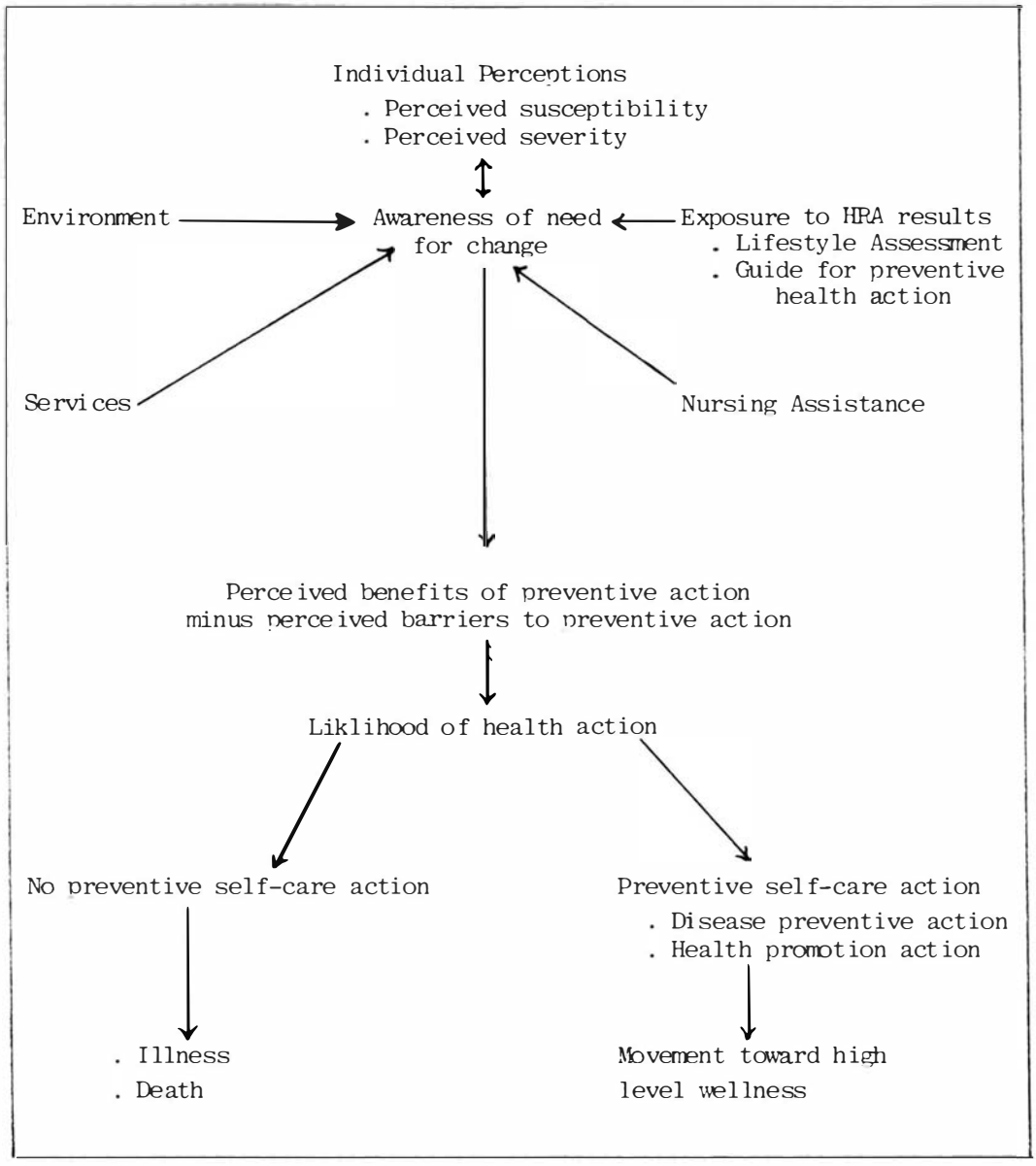
Holistic and humanistic orientations underly these two modes of wellness care. But, the importance of self-responsibility in moving toward the achievement of "high level wellness" with the health care provider serving as

facilitator is emphasized (Ardell and Newman). These roles and responsibilities are also referred to in Orem's self-care framework.

As previously discussed, this investigation focused on the use of the HRA as a tool for lifestyle assessment and guide for preventive health actions. In planning for effective health care education and counseling it is important to consider factors which motivate individuals to engage in health promoting actions, especially when they are free from symptoms of illness. Kasl and Cobb have cited the Health Belief Model developed by Hochbaum, Rosenstock, Kegeles and others to be the best explanation of health behavior engaged in by the asymptomatic individual (Kasl and Cobb, 1966, p. 250). This model postulates that individual health promotion efforts are a function of three factors: the degree of an individual's perceived susceptibility to a disease, the perceived seriousness of that disease, and the perceived benefits of preventive actions to reduce susceptibility to that disease (or severity of condition) as related to barriers to taking these actions (Haefner and Kirscht, 1970). Health risk appraisals are seen as an approach which make risks for and susceptibility to disease personally relevant. They "convey a sense of immediacy and urgency" while providing "a promise and a measure of implied risk if some of the factors are altered"(Colburn and Baker, p. 492).

The Health Belief Model to predict preventive health behavior (Becker et al., 1974, p. 206) has been modified

and expanded to incorporate the concepts of nursing assistance in preventive self-care, health risk appraisal, and the DHEW framework for prevention. By placing this model in a preventive self-care framework, the deliberate nature of preventive self-care action is emphasized. When one engages in preventive self-care action, progress toward the goal of high level wellness is made. Thus, Figure 1 serves as a schematic representation of the conceptual framework for this investigation.



Preventive Self-Care Decision-Making Process

Figure 1

Adapted from Becker et al. "A New Approach to Explaining Sick Role Behavior in Low Income Populations. "American Journal of Public Health", Vol. 64, No. 3 (March, 1974), p. 206.

Review of the Literature

Health Promotion Practices

With the growing interest in disease prevention and health promotion, epidemiological studies have shown an increasing emphasis on these areas. It has long been thought that those behaviors commonly accepted as "good" health practices are associated with "good" health. However, it was not until Belloc and Breslow's classic investigation began in 1965 that this relationship was scientifically tested (Belloc and Breslow, 1972). Their work through the Human Population Laboratory of Alameda County, California, involved a probability-based sample of 8,056 adults ages 20 and over. Questionnaires concerning physical health status and health practices were distributed to those in the sample and usable reports from 86% (6,928 adults) were returned. On the basis of a number of exploratory tests, the questionnaire had been developed as a measuring tool to quantify a broad concept of health covering a continuum from "severe disability" to "high energy level". From their responses, participants could be placed into one of the seven categories of physical health along this spectrum and compared to those in other groups. The questionnaire also elicited information about factors that might influence health status such as personal health habits, childhood history, and medical care. Data analysis in this investigation correlated personal health practices to physi-

cal health.

Results of the Belloc and Breslow study showed that "regular meals, adequate sleep, near average weight, physical activity, and avoidance of smoking and excessive drinking were all positively related to health" (p. 415). Each of these practices had a small, but statistically significant positive association with health (for the Chi-square test at 0.05 level of significance) and the effect of these practices was found to be cumulative. In other words, those who followed all practices were in better health, despite age, than those who did not. Also, these associations were found to be independent of age, sex, and economic status. No other common factors were found to substantially underlie the association between physical health status and daily habits studied.

Some have criticized the data analysis in this investigation saying that those individuals who are already in poor health may be unable to engage in many of these "positive" health practices. The authors, too, recognize this as a limitation of the study adding that investigating the dependent variable, physical health, in terms of the independent variable, health practices, is an oversimplification of a complex interrelationship. However, they remark "... sleeping patterns may be affected by poor health or may 'cause' poor health, but it seems less likely on the basis of considerable evidence that poor health 'causes' cigarette smoking" (p. 411). The investigators cite the need for long-

term studies in the area of wellness promotion with their concluding remarks. "The extent to which good habits contribute to the longevity of those who report many such habits, or persons acquire such habits as they advance in years, can be determined only by a longitudinal study" (p. 420).

As a follow-up to the investigation on health practices and physical health status, Belloc reported a study of the relationship between personal health practices and mortality that was done in the Human Population Laboratory 5½ years after the survey of 1965 (Belloc, 1973). Here, death certificates were used to determine the mortality rate for the original survey population. A Health Practice score of zero to seven was developed to quantify the degree to which subjects engaged in those behaviors previously determined as "good health practices". In this scoring system, subjects received one point for each of the positive health practices they engaged in. Results showed an inverse relationship between the Health Practice scores and mortality rates. This was especially true for the male population, and the relationship was found to be independent of income or physical health status.

Although they involved highly selective populations, two studies prior to Belloc and Breslow's work had also given some support to the hypothesis that health practices are directly related to health status. Palmore's study of data from the Duke Longitudinal Study of Aging provided

evidence that exercise, maintenance of a moderate level of weight and no smoking corresponds with less illness and greater longevity (Palmore, 1970). An investigation of seven categories of health practices (sleep, exercises, elimination, dental hygiene, smoking, alcohol consumption, and nutrition) and their relationship to socioeconomic status and health as reported by Pratt showed that "... the higher the quality of personal health practices, the higher the level of health and the fewer the health problems reported by the respondent" (Pratt, 1971, p. 283). However, the selective nature of the populations and small sample size involved in these two studies limited the generalizability of their findings. (Pratt's work was based on 401 mothers with children ages nine through thirteen and Palmore's sample consisted of 268 persons over the age of sixty).

Like Pratt, Green (1970) addresses the concept of preventive health behavior from a sociological perspective. This investigator posed that preventive health practices are directly related to preventive health norms or, "the nonprofessional (informal) social influences (pressure and supports) in the voluntary adoption of individual preventive health actions or behavior patterns" (p. 1). In his investigation of the preventive health actions of California mothers, he studied the relationship between social norms, socioeconomic status, and individual preventive health action. Preventive practices studied included immunizations,

prenatal care, preventive dental care, and well child visits. Health knowledge, future orientation and socioeconomic status were the non-behavioral variables most highly correlated with preventive health behavior (p. 107). In general, Green found the educational level of the mother to be the most important of all socioeconomic status variables in preventive health behavior. The findings also substantiated his claim that preventive health behavior is closely related to preventive health norms of a particular group. He concludes that "influence in matters of health, by and large, comes from informal social sources within reach of the individual. These sources are often somewhat higher in status, but not so much higher that the individual cannot identify with them" (p. 117).

Epidemiological Investigation of Risk Factors

Along with studies on health practices and their relationship to health status and longevity, epidemiological investigations have also begun to explore the area of risk factors -- those personal attributes/habits that are deterrents to optimal health and disease prevention. One of the earliest and most important studies of this nature was Hammond and Horn's investigation of relationships between smoking habits and mortality rates (1958). In their investigation, 187,783 men ages 50-69 were followed over a 44 month period. An excessive number of deaths occurred among men with a history of regular smoking as compared to age-specific mortality rates for non-smoking males. Higher

mortality ratios were noted as packs smoked per day increased. There was also a higher death rate associated with cigarette smoking as opposed to pipe or cigar smoking (Hammond and Horn, p. 1159).

In terms of the excessive deaths associated with smoking in this investigation, 52.1% of them were accounted for by coronary disease, lung cancer accounted for 13.5% and cancer of other sites was the cause of death in another 13.5% of the cases. An extremely high association between cigarette smoking and mortality rates associated with lung cancer was noted among participants in both rural and metropolitan areas. However, the high degree of association between cigarette smoking and total death rate was recognized as the most important finding of this study (Hammond and Horn, p. 1294).

Another, and perhaps best known of these epidemiological efforts is the ongoing Framingham Study, a longitudinal investigation examining factors associated with the development of cardiovascular disease (Kannel et al., 1976). This study began in 1948 with a sample of 5,209 male and female residents of Framingham, Massachusetts. Biannual clinical examinations are conducted on all participants and continuous surveillance on the sample's morbidity and mortality is maintained. Several host factors contributing to the development of cardiovascular disease have been identified including elevated serum cholesterol levels, high blood pressure, glucose intolerance, sedentary lifestyle, over-

eating, and cigarette smoking. Ways of quantifying the relative inpact of these various risks and predicting the possibility of developing cardiovascular disease within an eight year period have also resulted from data analysis in this longitudinal investigation.

The Multiple Risk Factor Intervention Trial (MRFIT) is another longitudinal study in progress at this time with a focus on cardiac risk factors (Smith et al., 1978) and final results anticipated in 1982 (Kuller et al., 1980). This investigation, however, is aimed at determining the impact that risk reduction of several factors has on reducing mortality from cardiovascular disease. The study is "multicenter, collaborative, randomized and non-double blind" in nature using a sample of 12,866 men ages 35-57 at high risk of death from coronary heart disease but without any evidence of pre-existing diseases. The MRFIT investigators have recognized age, sex, serum cholesterol, blood pressure, diabetes mellitus, and cigarette smoking, as high risk factors having the greatest impact in coronary heart disease. Of these, they have aimed the program's risk reduction efforts at cigarette smoking, hypertension and serum cholesterol since these "appear to offer the greatest potential for modification" (Smith et al., p. 293). To date, Kuller et al. report that the "treatment of hypertension and reduction of cigarette smoking have been accomplished according to protocol design goals. Only the blood cholesterol reduction has not been as large as required" (p. 198).

Community-Based Rick Reduction Trials

Along these same lines of cardiovascular disease pre-

vention, the Stanford Heart Disease Prevention Program Study was focused on risk reduction in large population groups (Farquhar et al., 1977). An experimental design was devised to investigate the effect of community education programs in reducing cardiovascular disease risk factors among three northern California towns. Results suggest the effectiveness of mass-media educational campaigns in achieving this goal. Coordination of one-to-one programs with such campaigns -- especially in the areas of changing smoking and dietary behavior -- enhanced the success of this public risk reduction effort.

As a continuation of this community based clinical trial, four subsamples from the original three-community population studied were identified as being at higher than average risk for cardiovascular disease. Three of these groups received continued exposure to mass media campaigns regarding the reduction of cardiovascular risk factors. One of these subsamples also received face-to-face instruction based on the application of Bandura's social learning theory and behavior modification techniques. The fourth group served as a control. Observations were made with three follow-up surveys. Cardiovascular risk reductions were noted in all treatment groups accompanied by more knowledge of risk factors and their modification. Greater and longer lasting changes in behavior occurred in the subsample exposed to additional one-to-one counseling. Meyer et al. (1980) conclude "the media alone has the

the power to influence the risk of heart disease and some related behavior; when, however, this is supported with face-to-face instruction, a broader range of behavior is susceptible to a greater magnitude of immediate and long-lasting modification" (p. 129).

Finally, the North Karelia Project provides another example of a comprehensive community program for health promotion (McAlister et al., 1982). The five year program was launched in North Karelia, a rural county in Eastern Finland (population 180,000) in 1972. Its aims were to improve the detection and control of hypertension, reduce smoking, and promote lowfat diets among this population with a strikingly high prevalence of cardiovascular disease. Program objectives were based on several health promotion models including improved preventive services, public information, persuasion, training, community organization, and environmental change. Thus, the North Karelia Project incorporates both individual and public education strategies along with an environmental modification approach to achieve the goal of risk reduction and health promotion in this community.

Random samples of residents in North Karelia and a neighboring county were surveyed in 1972 and 1977 so that cardiovascular risk factors between the treatment community and reference group could be compared. The project's impact on cardiovascular-related mortality has yet to be demonstrated, but many of the goals of health promotion have

been met as indicated by significant reductions in risk estimated for smoking, cholesterol, blood pressure and their combined effect. In fact, several of the program innovations have been adopted at the national level (including a smoking cessation program and development of new lowfat dairy products). Community involvement in cardiovascular disease prevention through family-based nutritional change activities, hypertension control efforts, and smoking cessation programs was one of the central ideas and probably most important concept of the program (McAlister et al., p. 46). With this in mind, the North Karelia Project is a promising case-study for community-based health promotion.

The Development of Prospective Medicine and HRA

With a growing interest in health promotion and expanding knowledge base in the area of risk factors for specific disease, the field of Prospective Medicine began to develop during the same time that many of these earlier investigations were carried out. The evolution of this area was seen primarily from 1961 on with the field based on the belief that "...early intervention of disease can be accomplished through recognition and reduction of specific risks" (LaDou et al., 1975). Methodist Hospital of Indiana has been recognized as the "home" for the concepts of both prospective Medicine and Health Hazard Appraisals[1] with Robbins

[1] "Health Hazard Appraisal" (HHA) was the name of Robbins and associates' first risk appraisal tool. Since then numerous appraisal tools have been developed. The instrument referred to and used in this investigation was the Center for Disease Control's Health Risk Appraisal (HRA).

and associates cited as pioneers in these two areas. They have defined the field of Prospective Medicine as "...that practice of medicine for the individual which is comprehensive in its concern for his total risk; continuous in its search for new risks; and initiated before disease and injury, beginning with a quantitative estimate of the patients' own risks and a program of priorities for their reduction" (Robbins and Hall, 1970).

Robbins and his associates developed the first Health Risk Appriasal as a tool to provide a perspective of people's health risks, demonstrate the quantitative and interactive nature of risk-taking behaviors, and illustrate the personal relevancy and immediacy of risks to health. Additionally, the tool was designed to demonstrate the potential benefits of modifying risk factors in terms of individual health. The appraisal combines age, sex, medical history, and health risk information to assess an individual's chances of dying within the next ten years of life. A discussion of the data used to generate these projections follows in Chapter 3. As Robbins points out, "the ultimate goal of HHA is to modify an individual's behavior by motivating changes in lifestyle (Robbins, 1981).

Thus, the HRA is based on the belief that providing people with information about their health risks will stimulate actions which are aimed at risk reduction. However, this hypothesis has not been fully tested (Colburn and Baker, 1973; Goetz et al., 1980). As Colburn and

Baker have stated, "The key word in modern day preventive medicine is motivation, the individual's desire to take measures to protect his or her own health" (p. 490).

The Health Belief Model

The Health Belief Model developed by Hochbaum, Rosenstock, Kegeles and others was originally formulated to explain preventive health behavior. Rosenstock states "... a decision to take a health action is influenced by the individual's motivation, his perceived susceptibility to illness, the perceived severity of illness, socially and individually determined beliefs about the efficacy of alternative actions, psychological barriers to action, interpersonal influences, and one or more cues or critical incidents which serve to trigger a response" (1974, p. 53). Simply stated, the Health Belief Model postulates that individual health promotion efforts are a function of three factors: the degree of an individual's perceived susceptibility to a disease, the perceived seriousness of that disease, and the perceived benefits of preventive actions to reduce susceptibility to that disease (or severity of condition) as related to barriers to taking these actions (Haefner and Kirscht, 1970).

Several investigations have been carried out to test the validity of this model. Hochbaum conducted the first research on the Health Belief Model with a study of factors underlying adults' decisions to seek a chest Xray as a screening measure for tuberculosis. Eighty-two per cent

of those seeking voluntary Xrays believed they could contract TB and felt early detection of this disease was beneficial (Hochbaum, 1958). Thus, this investigation "... demonstrated with considerable precision that a particular action is a function of the two interacting variables -- perceived susceptibility and perceived benefits" (Rosenstock, p. 34). Kegeles' et al. retrospective study on preventive dental check-ups added further support to the model by correlating individual perceptions of the severity of dental disease, the benefits of preventive action, and the barriers to action with the frequency of preventive dental visits (Kegeles, 1959). Subsequently, a three year follow-up study by Kegeles in the same area of preventive dental care further supported the hypothesized impact of perceived susceptibility, severity, and benefits of preventive action (Kegeles, 1963). Haefner and Kirscht's experimental investigation based on the Health Belief Model provided evidence that perception of susceptibility to disease and benefits of preventive action can be modified leading to changes in health behavior (Haefner and Kirscht, 1970).

Impact of HRA on Health Behavior

As previously mentioned, Rosenstock cites the need for an "instigating event" or "critical incident" before many overt preventive behaviors are displayed (Rosenstock, p. 5). Within the Health Belief Model, the Health Risk Appraisal results can be seen as such a cue for action. Ladou's study

to determine the impact of HRA patient counseling on the reduction of risk, in essence, studies the effect of the HRA as an instigator for risk behavior reduction (Ladou et al., 1975). In this investigation, HRA counseling was incorporated into an annual employee health examination program. A total of 488 HRA's were carried out with an explanation of results and recommendations for risk reduction measures made by the physician to each subject. Less than one year later, 107 subjects were randomly reappraised with results showing a reduction in their net risk of 1.4 years. Here the results were statistically significant. Ladou concludes, "such a reduction in risk age is significant: it indicates that appraisal-based counseling is an effective method of altering priorities of health practice" (p. 177).

Several other investigations have been conducted to assess the impact of risk appraisal on health behavior. Wilson et al. (1980) report a study designed to determine the impact of HRA alone on the health behavior of college students. The University of Wisconsin Lifestyle Assessment Questionnaire, a popular form of HRA, was distributed to a random sample of 170 undergraduate students living on campus. Fifty-three per cent of these questionnaires were completed. Computer health risk analyses were made available six weeks later, but only 27 of the respondents returned for their printouts. Guidelines for interpretation of the computer analysis were explained and lists of health promotion

literature and community resources were distributed to these 27. The remaining 62 subjects who had completed the lifestyle questionnaire but did not report for the computer analysis were used as a control group. The investigators recognized this as a limitation to their study since those who returned for their appraisal results may have been more highly motivated to engage in health promotion activities than those in the control group. However, the results which follow showed no significant differences between the two groups.

Four weeks after the HRA results were distributed, the subjects were contacted by phone and asked about changes in smoking, drinking, and seatbelt use during the previous month. So many smokers were lost to follow-up that change in this area could not be assessed. No significant changes in the positive direction by either group were assessed for drinking or seatbelt use. The investigators conclude that HRA alone is not an effective health behavior change tool for a college-age population. However, it may create a briefly heightened interest in health and encourage individuals to enter specific health risk reduction programs offering more effective behavior change modalities.

In another investigation, the efficacy of HRA in promoting positive health behavior and the effectiveness of health educators as opposed to physicians in health risk counseling were assessed (Johns, 1976). A random sample of 1,186 patients was drawn from a multispecialty clinic in

northern Utah and HRA's were mailed to them. Only 15% of the deliverable HRA's were completed and returned. The 144 respondents were randomly assigned to a physician, health educator, or control group. Both physicians and health educators had been trained in HRA interpretation and risk counseling. Individual counseling for the physician and health educator groups followed and literature on specific risk reduction strategies was distributed to these participants. Control subjects did not receive their risk appraisals or counseling until after the completion of the study. After a four month period, each of the three groups was sent an HRA questionnaire to complete and return for analysis.

Similar levels of risk reduction were found in physician and health educator counseled subjects. Regarding HRA results, there was a decrease in all risks in both treatment groups except for accident risk in the health educator group. However, few of these risk reductions were statistically significant. The small sample size in this study was noted to be a major limitation in achieving statistically significant results for comparisons of treatment and control groups. Johns states that a positive trend toward risk reduction was seen using HRA counseling. The low response rate in this study was of major concern to the investigator. He notes that the northern Utah population sampled was predominantly Mormon and could reasonably be considered health-oriented. If this type of population is not re-

ceptive to preventive risk reduction programs like HRA, Johns feels there may be even more problems generalizing them to other populations.

Milsum, Laszlo, and Prince (1976) report a pilot project to evaluate the efficacy and acceptance of HRA in a community health center environment. One hundred subjects ages 15 through 65 were given HRA questionnaires to complete. Individual counseling sessions followed. During these sessions guidelines for interpretation of risk appraisals and information on community resources for health promotion were presented. Soon afterwards and six months later questionnaires were mailed to all participants to evaluate their acceptance of HRA and its impact on their health attitudes and behavior.

Due to the small sample size and high rate of attrition (only 50% of the subjects completed the study), only trends in the data were examined. In general, the participants were very interested in the HRA procedure and found it beneficial in personal health promotion. The most outstanding areas of positive behavior change included exercise habits, bodyweight, and seatbelt usage. HRA had much less of an impact in the areas of smoking and alcohol use. Four-fifths of the respondents reported making at least one behavior change following exposure to their appraisal results. One-half made and maintained recommended behavior changes. Interestingly enough, several participants commented on the absence of questions related to stress management or

nutrition on the HRA instrument used. In order to provide a more accurate risk appraisal they felt these areas should be incorporated into the questionnaire.

Perhaps one of the best randomized and controlled investigations to assess the impact of HRA on health behavior was Lauzon's evaluation using 346 health Canadian federal civil servants (Lauzon, 1977). Subjects ranged in age from 30 to 55 and had never been exposed to HRA. Participants were randomly assigned to one of three groups: a control group which completed the HRA but did not receive the results, a treatment group which received HRA with interpretation only, and a treatment group which received HRA with interpretation and risk reduction counseling. Twelve weeks later, 293 subjects were retested with HRA. The State Trait Anxiety Inventory Self-Administered Questionnaire was also used to see if HRA affected personal anxiety.

No undue levels of personal anxiety were aroused by HRA. Lauzon notes that HRA did stimulate mild levels of anxiety in some that would be beneficial in promoting recommended behavior changes. In terms of health behavior, HRA stimulated significant reductions in alcohol intake, especially when combined with counseling. Males ages 30 to 40 and females ages 41 to 55 showed the largest degree of improvement in this area. A positive effect was also seen on levels of physical activity, especially for males in the sample. With respect to seatbelt usage and weight,

most subjects already demonstrated positive health behavior, so a limited potential for improvement in these areas was present. The strongest support for HRA came from significant appraised age reductions in both treatment groups. When comparing all three groups in this study it was clear that HRA was instrumental in stimulating positive health behavior change. The combination of HRA with risk reduction counseling produced even greater changes.

The investigations assessing the impact of HRA on health behavior discussed so far have all presented risk appraisal results to participants on an individual basis. However, HRA is rapidly becoming a popular health promotion strategy for groups as well. The CommonHealth Club of Sonoma County, California, is described as a "membership controlled, low-cost, comprehensive educational and motivational system for individuals to assess their own status" (Rodnick and Bubb, 1978, p. 599). In an investigation to assess the impact of a multiphasic screening program (including HRA) combined with group education the health behavior of 293 members of the CommonHealth Club was studied (Rodnick and Bubb). Two introductory health education sessions covering risk reduction for cardiovascular disease, cancer, and automobile accidents were presented. A battery of health screening tests including routine laboratory tests, pulmonary function studies, an electrocardiogram, Pap smear, weight and blood pressure checks were then performed. HRA's were also completed by all

participants. The results of this multiphasic screening were returned at evening group sessions conducted by a physician and health educator. One year later the same multiphasic screening was repeated on all subjects. During the interim, participants received monthly newsletters covering preventive health topics. Results showed significant reductions in systolic blood pressures for men and women ages 50 to 70, significant reductions in serum cholesterol for men over 40 and significant reductions in reported alcohol consumption by males. There were significant increases noted in breast self-exam by women, exercise levels among men and women, and seatbelt usage by both sexes. No changes were noted in cigarette smoking, weight, fasting blood glucose levels or serum triglycerides. The investigators conclude, "the combined use of HRA, multiphasic screening, and patient education can lead to reduction in cardiac and other risk factors in well-motivated groups" (p. 549).

In another group intervention, HRA was given to a group of 150 health professionals attending a Utah Public Health Association workshop (Warner, 1977). The goal was to heighten their awareness of their individual health status and motivate them to engage in healthier lifestyles so as to provide better role models for the public. A Health Practices Inventory and HRA was completed by all workshop participants prior to the opening of the conference sessions. The conference itself focused on health

promotion and risk reduction topics. Results of the appraisal and guidelines for interpretation were presented before the workshop adjourned. Personal contracts for health behavior change were then completed and signed by the participants. Each contractee's progress was reviewed with the workshop director six months and one year later. Follow-up was completed on 75 of the participants. Of these, 21 were 100% successful in meeting the terms of their contract. An increase in physical activity and maintenance or reduction of weight were the areas of change most frequently contracted. Fifty-five per cent achieved their physical activity goals and 25% achieved their weight loss goals. In this investigation the value of personal contact (by the workshop director) in sustaining behavior change was recognized. As Warner states, "Lifestyles and the interplay between persons and their environment and society are powerful forces in determining positive and negative health behaviors" (p. 123).

Investigations focusing on the use of HRA with individuals and groups have been presented. A final study takes a community approach to the implementation of HRA and risk reduction programs. Dunton and Rasmussen (1977) describe the results of a second HRA administration to volunteers in the University of Arizona's Well Aware About Health Program. The Well Aware Program was conducted in eight different communities in Arizona and consisted of HRA with interpretation of results, individual counseling, risk reduction seminars and periodically mailed educational updates. Two of the

program sites were urban, five were rural and one was suburban. From January 1975 to March 1977 approximately 2600 individuals took part in the program.

Only 24.7% of the original population data were analyzed since only a limited number of participants completed a second HRA (n = 164). The investigators recognize the limitations to the generalizability of their findings due to this small, non-random sample and lack of control group. However, they report several interesting trends in the data. First, significant differences at the .001 level were noted in reductions of appraised age. Overall, the group reduced their risk age by 20% of the total risk age reduction possible. When comparing changes in HRA's for the various groups, the investigators report, "for most groups, the amount of positive change is apparently directly related to the amount of initial risk, i.e., the greater the 'goal' or difference between risk age and achievable age, the greater the stimuli for measurable behavior change" (p. 119). Finally, in each of the eight community sites it was noted that an important factor in risk reduction was the sense of community and positive social support systems.

Summary

All of these investigations have alluded to the benefits of HRA use for health professionals. HRA serves as a screen for disease, gives priority to risk factor reduction plans, guides lifestyle change programs, provides an ongoing reminder to practice preventive medicine, and reduces health

care costs by promoting a healthier population. It is a particularly viable tool for nursing practice. As Milsum, Laszlo and Prince (1976 state,

> our experience suggests that nurses with public health or nurse practitioner qualifications embrace the goals of HRA readily, since it provides a useful tool in implementing their commitment to the idea of preventive medicine. This is especially true for those patients that may be classified as 'well' which fortunately constitute the largest proportion of a community health practice (pp. 95-96).

Research in the area of disease prevention and health promotion is still in its "infancy stage". Goetz et al., best summarize the state of affairs in this developing area:

> Whether identification of the populations and individuals at risk, coupled with programs that are known to decrease the prevalence of risk indicators, will in fact yield the dividends of healthier, more productive people and reduce expenditures related to illness, disability, and premature death is another, often controversial, issue. As more risk estimation and risk reduction are carried out, we must make sure that data to answer these questions are collected and analyzed. Once rigorous evaluative studies are carried out, resource allocation based on predictable outcomes will become possible. Such efforts are long overdue (p. 126).

Chapter III

METHODOLOGY

Population, Sample, Setting

Subjects in this investigation included a total of 36 volunteers from the young adult groups of two Richmond, Virginia United Methodist churches and their friends. Thirty subjects completed the study so that the final sample included 11 males and 19 females with ages ranging from 23 to 38. The sample attrition for this study is illustrated in Figure 2. The fact that the subjects in this study constituted a convenience sample limits generalizability of the findings. However, the homogeneity of both young adult groups with regard to socioeconomic status served as a control for possible extraneous influences on the study variables. Both churches serve a middle to upper-middle class population. Pratt (1971) has cited the impact of socioeconomic status on health care practices.

The screening form (Appendix C) completed by subjects at the onset of the investigation assured the limitation of additional extraneous variables in this investigation. Any volunteers with less than a sixth grade education level, significant health problem or physical disability, or undergoing psychological counseling at the time of the investiga-

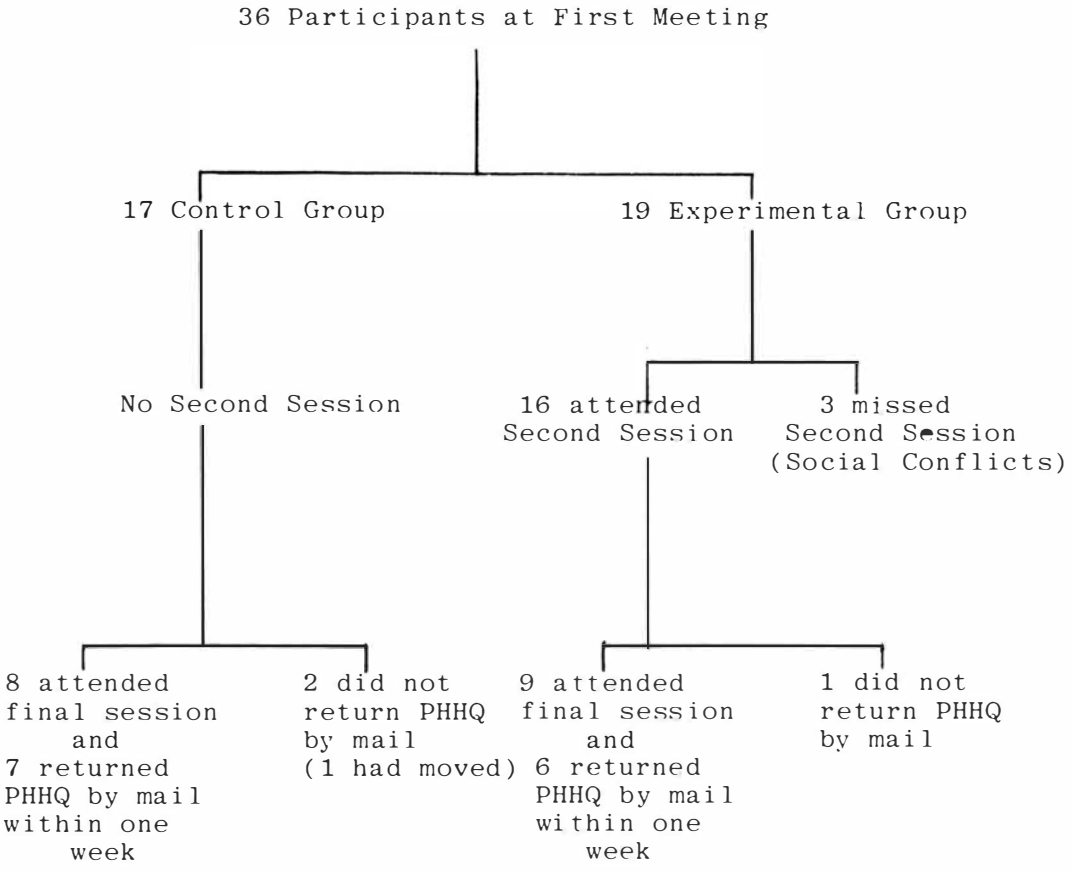


Figure 2

Sample Attrition

tion could have completed the HRA, but their responses would have been eliminated from the data analysis procedures. The rationale for this screening process was that this investigation focused on disease prevention and health promotion in a "well" population. However, none of the screening form responses necessitated the elimination of subjects.

The setting for the pre- and posttest sessions of this investigation was the fellowship hall of a church. Long tables with six to eight chairs at each were arranged in two rows for the paper and pencil questionnaire. The investigator conducted both of these sessions from a podium at the front of the room. For the second session, attended by experimental subjects only, the parlor of the church was used. Participants were comfortably seated in cushioned chairs arranged in a semicircle as the investigator explained the procedure for interpreting HRA's. During all three sessions the doors to these respective areas were closed, to minimize interruptions.

Instrumentation

Health Risk Appraisal (HRA)

Background. Several health risk appraisals have been developed for use by health care providers and the health consumer-at-large today. They vary in length from two to twenty pages and can cost up to $25.00 for analysis. The tool selected for use in this investigation is the Center for Disease Control's Health Risk Appraisal (Appendix A).

It is easily read and requires an average of seventeen minutes to complete. Furthermore, the CDC is still actively involved in researching the use of this tool. Therefore, they will perform the computerized analysis of the appraisals free of charge in return for the investigation results.

The HRA generates a comparison of the subject's actual chronological age, health appraisal age (that is, their health age in terms of the number and impact of risk factors they possess), and their achievable age (or the possible appraisal age that can be achieved with a reduction in risk factors). The term "risk factor" according to the HRA refers to "a measure of the effect of any prognostic character which varies the patient from the average of his age, sex, and race" (Robbins and Hall, 1970, p. 20). These risk-related characteristics include personal and/or family disease history, specific habits, and test values. For example, a family history of myocardial infarction combined with a sedentary lifestyle and high blood pressure readings would be prognostic characteristics associated with an increased risk of cardiovascular disease for an individual, compared to others in the same age-gender-race category.

The original tables for health risks were the result of a 20 year medical literature review by Norman G. Gesner, an actuary (Goetz, et al., p. 120). Several recent epidemiologic studies discussed in the literature review have been designed to further investigate risk factors. The Framingham and American Cancer Society studies have been the two

principal investigations from which risk factors have been identified and quantified (HSRC - UNC, 1980). Risk factors have also been delineated in other studies by insurance firms, medical schools, hospitals, and government agencies. Thus, knowledge in this area is being continuously updated. With advances in computer technology and biostatistics along with an expanding knowledge base in the pathophysiology and biochemistry of disease processes, quantifying the magnitude of these various risks has become increasingly possible. As Goetz, et al., have pointed out, "Identifying the variables known to influence individual risk, quantifying their effect and interaction, and construction of algorithms to estimate risk are fundamental to risk appraisal" (p. 119).

In 1960, Harvey Geller of the U.S. Public Health Service developed tables representing the probability of death within ten years from specific causes for age-gender-race cohorts. He based these tables on the 1960 U.S. Census data on the population and mortality. To construct these probability tables, Geller collected data on all causes of death and compiled it into age-gender-race cohort groups where age was divided into five year intervals. This yielded comparative information on the leading causes of death for various cohorts. Next, he used the Reed-Merrill formula for constructing abridged life tables to estimate the probability of dying from all causes within the next five years. Finally, these computations were expanded to make a ten year death-probability estimate. This information combined with Gesner's tables of health risks is currently being used by

all orginizations in the U.S. involved in the development of health hazard appraisal tools (HSRC - UNC). Mortality rates in the original Geller-Gesner tables from 1970 were recently updated with statistics from the U.S. National Center for Health Statistics estimates for 1977. To assure systematic updating of these tables, the CDC now plans to revise the mortality statistics annually by using a three year moving average (HSRC - UNC).

By multiplying the appropriate age-gender-race specific average morbidity/mortality from Geller's probability tables with the quantitative weight assigned to an individual's risk factor profile, an estimated risk of disease/death is obtained (Goetz, et al., p. 122). Thus, risk estimates can be generated for developing specific diseases, dying from certain diseases and dying within a given time period. The CDC HRA focuses on risks of death from specific diseases and within defined time periods.

Several health risk appraisal programs have recognized the limitations of age or life expectancy estimates for younger populations. In these individuals, life expectancy is greatly influenced by accidental death rather than death from chronic diseases, so there is little potential for behavior change to reduce the current risk appraisal age. Yet, prognostic characteristics for major causes of death in later life (smoking, obesity, heavy drinking, etc.) may be present in their lifestyle. Since this investigation dealt with a young adult population, the approach of

using a current and projected HRA (for age 40) was used. The addition of morbidity risk factors to HRA has also been considered as one way to make assessment figures more pertinent to young adults (HSRC-UNC). So far, little progress has been made in this area.

Validity and Reliability of HRA. Inaccuracies in the mortality data on which HRA estimates are based and the need for improved information on risk factors and their relative weight have been recognized. Goetz, et al., further scrutinize the validity of health hazard appraisals by pointing out that a comparison of an individual's risks with past groups having the same risk factors assumes "that the presence of the same set of risk indicators then and now has the same health consequences" (p. 122). This assumption becomes difficult to validate.

Recent health promotion efforts have emphasized the importance of physical activity for healthier lifestyles. Landry, et al., (1978) hypothesized that "if a higher level of fitness contributes significantly to risk reduction at any given age, it should then follow that individuals with the higher fitness test results should on the average tend to have negative appraisal - given age test scores" (p. 38). To test this hypothesis 236 randomly selected subjects were evaluated for their physical fitness status in terms of per cent body fat, maximal oxygen uptake capacity and muscle endurance. An HRA was also performed on each of the subjects. Multiple regression analysis used with males and

females of various age groups showed a positive relationship between the fitness determination and the HRA results.

A recent study which questions the reliability of the HRA also raises questions about this tool's validity. This reliability study, by Sacks, Krushat, and Newman tested the reproducibility of HRA responses among 203 study subjects (1980). Only 15% of the sample had no contradictions in responses to the questions approximately three months after completing the first appraisal. In other words, HRA responses from 85% of the sample reflected change in unchangeable variables such as height and past medical history. There was an average of 1.6 contradicting answers per subject. These investigators conclude, "the reliability of the HRA questionnaire should be seriously questioned. Previously reported successes with health hazard appraisals in stimulating risk reduction may simply reflect the variation in response (and therefore outcome measures) when an individual takes the questionnaire twice" (p. 732). Similar discrepancies in HRA pre- and posttest responses were cited in a report of a smoking cessation program using HRA as an adjunct. Here, the HRA was administered to participants before and after exposure to the smoking cessation program. The investigators noted almost as much change in responses which should remain constant in the HRA (e.g., family history, medical history, and frame size) as in lifestyle behaviors susceptible to change (Best and Milsum, 1977). The authors conclude by recognizing the

need for further research on HRA test-retest reliability and conditions creating unreliability (p. 96).

Despite these discrepancies in test-retest reliability, Doerr and Hutchins (1981) and Goetz and McTyre (1981) all point to the fact that the reliability of the HRA has not yet been fully assessed. Goetz and McTyre warn of the "pitfalls" involved in a test-retest design for establishing reliability stating "some of the properties of HRA are similar only superficially to those of familiar psychometric instruments" (p. 308). They further develop this point by saying "there is no justification for assuming that the motivational situation on re-admission of an instrument is the same in tests as it is in HRA questionnaires" (p. 308). Doerr and Hutchins state, "where the issue of reliability has been addressed at all, the work is at best illustrative and methodologically unsophisticated" (p. 302).

In terms of this invesgation's design, the PHHQ was used as a pre- and posttest measure of the degree to which the study subjects engaged in various health-promoting activities. The HRA was only the treatment available. That is, printed results from the HRA served as a "cue for action" among experimental subjects. Thus, the criticism of the HRA as a poor pre- and posttest measure of health behavior is not applicable in this case. As Best and Milsum (1977) point out, the assessment of current risk (provided by HRA) and the assessment of behavior change require "different approaches to the conceptualization and analysis of data"

(p. 96). They advise the development of data processing methods that are "sensitive to the full range of positive health behavior changes, involving sometimes considerable subtlety in analysis" (p. 97). The PHHQ pre- and posttest was designed in attempts to achieve this goal.

The fact that the field of prospective medicine is still in its infancy accounts for much of the debatable reliability and validity of health risk appraisals. Further studies and refinements on present appraisal tools are needed to increase their reproducibility. Continuous updating of data bases for morbidity and mortality along with expanding knowledge in the area of risk factors will enhance their validity. And, as Goetz et al. state, the widespread use and longitudinal follow-up of health risk appraisals themselves will contribute to the risk estimation knowledge base (p. 125).

Personal Health Habits Questionnaire

Background. The Personal Health Habits Questionnaire (PHHQ) (Appendix B) was based on a tool used in two previous studies by the Human Population Laboratory. In both the 1972 report by Belloc and Breslow relating physical health status to health practices and the 1973 report by Belloc discussing relationships between mortality and health practices, their survey was used to determine where, on a continuum, peoples' health habits fell in comparison to those behaviors commonly accepted as "good health practices". The Human Population Laboratory tool elicited information in the areas of smoking, weight as related to height, drinking, sleeping patterns,

nutritional habits, and physical activity. As discussed in the literature review, Belloc and Breslow's research showed that specific practices in these areas were associated with the most favorable levels of physical health.

The author's PHHQ incorporated items relating to the same six areas covered by the Human Population Laboratory tool. Questions concerning use of stress management techniques and seatbelts were added as these measures are frequently cited in the current literature as important personal health promotion strategies. For additional interest, a question relating to general sense of well-being was included to observe any changes in the subjective feelings of participants between pre- and posttests. Although the HRA does not make assessments or recommendations related to each of these areas, this investigator felt that positive alterations in health behaviors based on HRA recommendations might have a holistic or "carry-over" effect to other areas. For example, changing from a sedentary exercise pattern to a regular pattern of moderate exercise might also be associated with decreasing sleep from nine to eight hours each night and snacking less between meals. Thus, the PHHQ was designed to provide a holistic overview of health behavior.

Validity and Reliability of PHHQ. After its construction, the PHHQ was pilot-tested on five young adults for clarity and ability to stimulate meaningful responses. Although the validity and reliability of the PHHQ have not been formally established, content validity of the tool was

assured through consultation with experts in the field of nutrition, physical fitness and preventive medicine. The PHHQ is basically a self-report on personal health practices. Use of such a tool assumes that individuals will respond to questions honestly and accurately. This assumption is in keeping with the self-care framework upon which this investigation is developed.

Based on the results of two previous investigations, it is possible to project that individuals' self-reports on health care practices are reliable and valid. An analysis of data on 3,373 subjects ages 14-61 years from the Rand Health Insurance Study was carried out to evaluate the reliability and validity of self-reported heights and weights (Stewart, 1982). Here, height and weight were measured by responses to self-administered medical history questionnaires and by trained technicians at a medical screening examination with a time lapse between the two measurements of one month or less in 95% of the cases. Stewart concludes that "Self-reported weight and height are remarkably accurate indicators of actual weight and height. These measures were valid and reliable even in groups of people for whom one might expect the data to be of a poorer quality (e.g., those who are severely overweight, those with less education)" (p.31).

In the investigation by Meltzer and Hochstim of the Human Population Laboratory (1970), two questions were addressed: "How consistently do people answer questions

about their health when a survey is repeated after a short interval?" and "How closely does the information collected by surv4y agree with that obtained from clinical records?" (p. 1075). Identical surveys on health were administered to a probability sample of 1,530 individuals one week apart for the study. Ninety-six per cent of the original responses were repeated on the second survey. Statistics for validity were not as impressive as those for reliability. However, a validity check of the responses was more difficult to carry out due to the incomplete nature of many of the respondents' medical records. It is still significant that for the respondents, "54 percent of the chronic conditions reported by questionnaires were reported in their clinical records" (p. 1085).

Procedure of Data Collection

Preliminary steps for data collection included arranging for the use and analysis of the CDC Health Risk Appraisal (Appendix D). Verbal consent was obtained from a local United Methodist minister for use of the church facilities. Finally, plans for the investigation were reviewed and approved by the Committee on the Conduct of Human Research (Appendix E).

Flyers announcing this health promotion study were distributed to the young adult group members of both churches two weeks prior to the beginning of the investigation (Appendix F). Those interested completed and returned the tear

sheet at the bottom of the announcement. Group members were also invited to bring other interested young adults to participate. During the week prior to the initial session, phone calls were made to those indicating interest to remind them of the time and location of the first meeting. For every session, free childcare services in the church nursery area and nutritious refreshments were offered.

The first session was held on March 3, 1981, from 7 to 8 p.m. Participants were randomly assigned to the control or experimental group as they entered the fellowship hall using the Latin Square method of treatment assignment (Li, 1964, p. 191). This method was chosen as it provides for random assignment with fairly equal distribution of subjects into the desired number of groups.

As subjects were assigned to the experimental or control group, they were given a packet with a blue or gold coupon respectively (Appendix G). Each coupon was numbered (even numbers appearing on blue tickets given to experimental subjects and odd numbers appearing on gold tickets given to control subjects) and served a three-fold purpose. First, the number on the claim coupon served as an identification code for each participant's HRA questionnaire and PHHQ screening form. This way subject anonymity could be preserved. Secondly, these wallet-size coupons servedas "claim tickets" for experimental subjects to receive their HRA printouts. Finally, the coupons became an easily carried reminder method for study subjects. On the back of each

ticket was written the date and time of upcoming sessions they were scheduled to participate in (depending on their experimental/control group status).

The forms in the packets with coupons were identical and included a participant information card, a voluntary informed consent form, and a participant screening form. The participant information card was a three by five-inch index card with spaces for participants to list their identification number, name, address, and phone number (Appendix H). They were placed in a file box and brought to each session for subjects to refer to in case they lost their identification numbers. The cards also became a convenient "directory" for reminder calls and letters to participants prior to each session. Subjects were asked to complete the cards along with the Voluntary Informed Consent (Appendix I) and Screening Form (Appendix C) as soon as they were seated.

Once everyone had completed this initial set of forms, the investigator thanked them for coming and offered some introductory remarks about the study. All participants were informed that they would be receiving their HRA computer printouts during the second or third session depending on whether they were in the blue or gold group respectively. The schedule for upcoming sessions was also reviewed.

Next, the PHHQ was distributed to all subjects for completion. They were urged to complete both this questionnaire and the HRA as honestly and accurately as possible. For questions which seemed irrelevant, participants were instructed to answer them as best

they could. Once they completed the PHHQ, they were given an HRA questionnaire to answer. Both completed forms were left on a table at the front of the room and refreshments were served.

The second session, was held on March 22, 1982, from 7 to 8 p.m. Telephone calls to remind experimental subjects of this meeting were made during the prior week. When all participants had arrived, their individual HRA computer printouts were distributed (Appendix J). Interpretation of results was given using the CDC guidelines, "How to read your Health Risk Appraisal" (Appendix K). Following a discussion of the printout, questions that groups members had on interpreting their HRA's were addressed. At the conclusion of the session a one-page summary from the CDC, "Understanding Your Health Risk Appraisal", was distributed to each subject (Appendix L). All were thanked for their partipation and encouraged to return for the third and final session.

On May 3, 1981, the final session was held for both experimental and control subjects. Two weeks prior to this meeting, reminder notices (Appendix M) were mailed to each participant. During the week before the session, telephone calls were also made to the subjects reminding them of the upcoming meeting. Each person was given a PHHQ to complete as they arrived. The return of these questionnaires marked the end of the formal data collection process. A movie on stress management followed. A "wellness" bibliography of

suggested readings, health promotion pamphlets, and listing of community resources for health promotion were also made available. PHHQ's were mailed to those unable to attend the final session with a request that they complete the questionnaire and return it within a week.

Chapter 4

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

Introduction

The research question addressed in this investigation was "What effect does exposure to the results of the HRA have on young adult health promotion behavior?" According to the hypothesis, young adults exposed to the results of their personal HRA would demonstrate a significantly higher health habits change score than young adults who were given the HRA but not exposed to their results. The PHHQ was used as a pre- and posttest assessment of health behavior among all participants. A health behavior change score was derived for each participant by comparing the direction and nature of change in health habits from pre- to posttest assessment. An explanation of the health habits change scoring system is included in Appendix N.

Characteristics of the Sample

The sample was 30 young adult volunteers ranging in age from 23 to 38 years. They were randomized into an experimental or control group with 15 members each. In the experimental group there were two males and 13 females ranging in age from 23 to 37 with a mean age of 27.8 years. Control sub-

jects included nine males and six females with an age range of 23 to 38 and a mean age of 28.5 years (Table 1).

When considering the mean chronological age for the treatment and control groups, it is interesting to compare these averages to the mean HRA appraised age for each group. Based on HRA computer printouts, the mean HRA appraised age for experimental subjects was 21.1 years while their average achievable age was 18.9 years. This indicated that there was a mean 2.2 year difference between the experimental subjects' HRA appraised and achievable ages. In other words, by changing their health risk behavior to health promotion activity, experimental subjects could reduce their health appraised age by an average of 2.2 years (Table 1).

On the other hand, control subjects had a mean HRA appraised age of 26.5 years while their average achievable age was 21.7 years. Here, the difference between the mean appraised age and mean achievable age was 4.8 years. over twice the mean difference seen for the experimental group. Again, this 4.8 year difference indicated the potential for health appraisal age reduction which could be achieved through risk behavior modification (Table 1). Therefore, the HRA-based potential for risk reduction was over twice as great in the control group as it was in the treatment group.

With regard to other characteristics of the sample, the majority had attained a college level of education or higher. Educational background among experimental subjects

Table 1

Chronological Age, HRA Appraised Age, and HRA Achievable By Group

Category	Age in Years Experimental Group n=15	Control Group n=15	Total Group N=30
Chronological Age			
range	23-37	23-38	23-38
mean	27.8	28.5	28.1
HRA Appraised Age			
range	12.7-34.2	11.1-41.2	11.1-41.2
mean	21.1	26.5	23.8
HRA Achievable Age			
range	11.7-31.8	11.1-39.1	11.1-39.1
mean	18.9	21.7	20.3

ranged from 12 to 18.5 years with a mean of 15.5 years. There was a range of 12 to 19.5 years of education in the control group with an average of 16.3 years. A wide variety of occupations was represented by both experimental and control subjects. In terms of health-oriented professionals, there was a balance between the two groups with three registered nurses in the experimental group and two registered nurses and a medical student among the control subjects.

None of the responses to the screening item concerning significant health problems, physical disability or present engagement in psychological counseling necessitated the elimination of their pre-, posttest responses from data analysis procedures. However, it was interesting to note that a variety of minor health problems, often cited as stress-related (Ardell, 1977, p. 135), were reported. These included depression, irritable colon, and inflammation of the cervical vertebrae. Other minor health problems reported were food allergies and pityriasis rosea (a type of skin rash).

In terms of specific HRA recommendations for risk reduction, more frequent use of seatbelts, increased levels of regular exercise, and routine performance of breast self-exam were the most common suggestions noted on the HRA printouts for all subjects. Table 2 shows the frequency distribution of all HRA recommendations for the subjects in this study.

Table 2

Frequency of Risk Reduction Recommendations by Group

Risk Reduction Recommendation	Frequency of Recommendation in Experimental Group (n=15)		Frequency of Recommendation in Control Group (n=15)		Frequency of Recommendation in Total Group (N=30)	
	number	%	number	%	number	%
Increase seatbelt use	9	60	13	86	22	73
Increase regular exercise	11	73	8	53	19	63
Regular breast self-exam *	10	(76)	5	(83)	15	(78)
Decrease weight	6	40	6	40	12	80
Decrease drug use	3	20	4	26	7	23
decrease alcohol use	1	6	3	20	4	13
Stop smoking	1	6	2	13	3	10
Regular Pap Smear	2	13	1	6	3	10
Reduce suicidal risk	1	6	1	6	2	6

* NOTE: There were 13 females in the experimental group and six females in the control group for a total of 19 females in the study. Percentages of recommendation frequency are based on these numbers.

Health Habits Change Score

Once a health habits change score (HHCS) was derived for each subject, a mean HHCS was computed for the experimental and control groups. For the treatment group the mean HHCS was +1.3 while the mean score for control subjects was -0.5. The t-Test for independent groups was then used to compare the mean HHCS between the two groups. This was the appropriate inferential test to employ for two reasons. First, the data consisted of two sets of sample measurements (change scores for experimental and control subjects). Secondly, although the health habits change scoring system is discrete in nature and based on underlying nominal scales, it can be treated as continuous data. Use of non-parametric statistics such as Chi-Square would not reflect the descending relationship of the +2 to -2 health habits change scores (Minton, 1981). Variance between the two groups can be assumed to be equal due to the random assignment of subjects to experimental or control treatments (Minton, 1981; Knapp, 1978). The two groups were also similar in age and educational background.

The null hypothesis for the study states that there is no difference in the HHCS between experimental and control subjects. As conventional for behavioral science research, the five per cent level of significance was chosen. This is an acceptable level for hypothesis testing since the risks associated with statistical error are low. Application of the

t-statistic (Knapp, 1978, pp. 107, 45) resulted in a t value of 1.85 with 28 degress of freedom. This value fell well beyond the critical value of 1.7011 and thus the null hypothesis was rejected. Therefore the alternate hypothesis that a significant difference ($p \leq .05$) exists between the HHCS for experimental and control groups was accepted. It is significant here to recall that HRA-based potential for risk reduction was twice as great in the control group as it was in the treatment group. Despite this, experimental subjects still demonstrated significantly greater health behavior change scores.

The data therefore supports the hypothesis of this investigation. That is, that young adults exposed to the results of their personal HRA will demonstrate a significantly higher HHCS than young adults who are given the HRA but not exposed to their results.

Health Behavior Changes

To compare trends in specific health behavior changes for treatment and control subjects, average behavior change scores for each health habit on the PHHQ were calculated. Mean scores for both experimental and control groups are listed in Table 3. When these behavior change scores are rank-ordered for experimental subjects (exposed to their HRA printouts) one can see that seatbelt usage, breakfast habits, and weight reduction were the areas with the greatest movement towards optimal behavior (Table 3). A t statistic was also calculated to compare the experimental and

Table 3

Mean Health Habit Change Scores (HHCS) for all PHHQ Items

Health Behavior	Mean HHCS Experimental Group	Mean HHCS Control Group
Seatbelt usage	0.60	0.40
Breakfast habits*	0.40	-0.13
Desirable weight	0.33	0.07
Sleep	0.27	0.13
Alcohol use	0.13	0.20
Sharing personal concerns	0.13	-0.47
Snacking	0.07	0.33
Physical activity	0.07	-0.13
Smoking	-0.13	-0.06
Stress Management	-0.53	-0.73

* $t = 2.40$, significant at $p \leq .05$

control groups' mean scores for each PHHQ item. The only specific PHHQ item in which the experimental group had a significantly greater HHCS was the one concerning breakfast habits. Although mean change scores for other items were not significantly greater, it is important to remember that the cumulative impact of HRA exposure on all PHHQ items resulted in a significantly greater total change score for experimental subjects.

A marked improvement in seatbelt usage was not surprising since this is a relatively simple health promoting behavior to acquire. As Saward and Sorenson (1978) point out, the most successful preventive measures are those requriing the least individual effort (p. 891). Even one control group subject (#17) demonstrated a significant change in seatbelt usage (Appendix Q). This participant reported using seatbelts 1% of the time on the pretest and 70% of the time on the posttest. This change may have resulted from the impact of exposure to the HRA questionnaire alone.

HRA does not deal directly with nutritional habits. The growing trend for breakfast consumption could be attributed to a "holistic carry-over" effect from exposure to HRA results. In other words, as individuals followed HRA recommendations for health promotion efforts to other areas of health behavior. The next largest change seen in the positive direction was weight reduction. Most weight reduction plans recommend three meals per day including breakfast. Therefore, the growing frequency of

breakfast consumption in the experimental group could also be related to the weight loss reported. A comparison of mean HHCS for breakfast habits and desirable weight in treatment and control groups (Table 3) lends support to this explanation. Here, control subjects demonstrated a negative change in breakfast habits along with a limited positive change toward the achievement of desirable weight.

Previous studies have found HRA effective in stimulating favorable changes in health behavior. This is especially true for areas such as alcohol use, body weight, breast self-exam, and seatbelt usage (Hall and Zwemer, 1979). In this investigation, the frequency of recommendations for reduction of alcohol use was low for the experimental group (this recommendation appeared on only one subject's HRA printout) and engagement in breast self-exam was not incorporated into the PHHQ due to the limited time frame for the study. In terms of risk reduction activities, it is also important to remember that the modification of one risk behavior may be accompanied by the adoption of another. For example, one subject (#30) reported having lost some weight but also resumed smoking in the meantime (Appendix Q).

As a final comment, decreasing drug use and reducing suicide risk are two HRA recommendations which appeared for both groups (Table 2). Here, drug use refers to the use of medications to affect mood or assist with relaxation.

Suicide risk is assessed on the basis of the HRA Suicide Scale (Appendix P). This scale is based primarily on a suicide risk scale developed by Calvin Frederick at the National Institute of Mental Health. Risk points are assigned to HRA questionnaire items concerning physical health, life satisfaction, social ties, hours of sleep, loss or misfortune, and marital status. The points are then totaled and compared to the suicide risk ranges to determine whether an individual's risk for suicide is above average, average, or below average.

Maintenance of Health Behavior

Since the health habits change scoring scheme was designed to assess change in health behavior over time, no points were awarded to the maintenance of either positive or negative health behavior. However, HRA has been cited by many as a method for positive reinforcement of health promotion practices as well as a technique to motivate behavior change. To assess whether there were any significant differences in the type of health behavior maintained between experimental and control subjects, all pre-post-test PHHQ responses indicating no change (i.e., receiving a score of zero on the health habits scoring scheme) were analyzed. Maintenance of positive and negative health behaviors in experimental and control groups were tabulated for these responses (Table 4).

Table 4

Positive and Negative Health Behavior Maintenance
Among Experimental and Control Subjects

	Positive Behavior Maintenance		Negative Behavior Maintenance		Total Behavior Maintenance	
	f	%	f	%	f	%
Experimental Group	65	83	13	17	78	100
Control Group	48	62	30	38	78	100

(Chi-square = 9.4; significant at $p \leq .05$)

Since the categories of positive health behavior maintenance and negative health behavior maintenance are theoretically independent of each other and frequency of both types of behavior maintenance was being assessed, the Chi-Square analysis was used. The null hypothesis for this comparison of types of behavior maintenance between experimental and control groups stated that the proportion of positive health behaviors and negative health behaviors maintained was the same for both groups. The alternate hypothesis stated there were significantly different proportions of positive health and negative health behavior maintenance for experimental and control subjects. A five per cent level of significance was chosen for this statistic as conventional for behavioral science research. Application of the Chi-Square test resulted in a Chi-square value of 9.4 with one degree of freedom. This value fell well beyond the critical value of 3.841. Therefore, the alternate hypothesis that there is a significant difference in the proportion of positive and negative health behavior maintenance between experimental and control groups was accepted ($p \leq .05$). The confirmation of this hypothesis adds support to the claim that HRA is beneficial not only in stimulating risk behavior reduction but also in reinforcing current positive health practices.

State of Well-Being

The final question of the PHHQ, "In general, how have you been feeling?" was used to assess any changes in per-

ceived state of well-being that might have been experienced along with the adoption of health promotion behaviors. For this item, pre- and posttest responses for all subjects were scored as positive, negative or neutral by three objective raters. Here, the degree of interrater reliability was 83.3% (Polit and Hungler, 1978, p. 431). This reflects reliability as a percentage of agreements in scoring between raters.

The frequency of positive, negative and neutral responses for both groups pre- and posttest are shown in Table 5. As the table indicates, both groups felt subjectively better at the end of the study. The fact that both groups showed this improvement in subjective well-being could be due to the combined effect of nominal data evaluation with a small sample size. Seasonal changes might also have contributed to the similarity in subjective responses by experimental and control groups. The pretest was administered early in March while posttests were completed in May. This investigator believes a change in seasons from late winter to mid-Spring contributes to a greater sense of well-being in many.

Table 5

Self-Perceived State of Well-Being

(Responses to PHHQ item #17: In general, how have you been feeling during the past week?)

	Pre-Test Responses						Posttest Responses					
	Positive Responses		Negative Responses		Neutral Responses		Positive Responses		Negative Responses		Neutral Responses	
	f	%	f	%	f	%	f	%	f	%	f	%
Experimental (n=15)	9	60	4	27	2	13	12	80	2	13	1	7
Control (n=15)	6	40	4	27	5	33	12	80	2	13	1	7

Chapter 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary and Conclusions

The purpose of this investigation was to evaluate the effectiveness of individual Health Risk Appraisal (HRA) results as a stimulus for young adults to pursue health promoting behavior. A pretest - posttest control group design was used to address the research question: What effect does exposure to the results of the HRA have on young adult health promotion behavior? Thirty-six young adult volunteers ages 23 to 38 were randomly assigned to either the control or the treatment group. An investigator-designed Personal Health Habits Questionnaire (PHHQ) and HRA were completed by all subjects at an initial group meeting. The HRA questions were then submitted to the Center for Disease Control, Atlanta, for computer processing. At a second meeting for experimental subjects only, individual risk appraisals were distributed and guidelines for interpretation given. Six weeks later, at a third and final group meeting, the PHHQ was completed again by all subjects. Thirty subjects completed the study.

PHHQ pretest to posttest health habits change scores revealed a significant positive change in the experimental

group's health behavior as compared with control subjects (Student's t Distribution, $p \leq .05$). This supported the hypothesis positing that, "Young adults who are exposed to the results of their personal HRA will demonstrate a significantly higher health habits change score than young adults who are given the HRA but not exposed to its results." The greatest degree of positive health behavior change was seen in the areas of seatbelt usage, breakfast habits, and achievement of desirable weight for body height and frame, in that order. In addition, Chi-Square analysis revealed that experimental subjects also maintained a significantly higher proportion of positive health behavior than those who did not receive the HRA results ($p \leq .05$).

Implications

The generalizability of these finding is limited by the small sample size. The use of volunteer subjects in this investigation may have created a selective bias for a sample more motivated to pursue health promotion and risk reduction than the population of all young adults. But even here, significant risks to health were appraised and experimental subjects did show significant positive changes in health behavior as compared to control subjects. The maintenance of a significantly greater proportion of positive health behavior in experimental subjects suggests that HRA can serve as positive reinforcement for health behavior that is already health promoting. Exposure to HRA results also seems to have a generalized impact on

health behavior. That is, a positive trend in health behavior change permeated even areas not addressed by the appraisal such as nutritional habits and stress management.

This investigation assessed only the initial impact of HRA on health behavior. The results suggest that exposure to HRA results can serve as an initial stimulus for risk reduction and health promoting activities. However, the permanency of behavior change following exposure to HRA alone was not addressed since the study examined only a six week time period. In a previous investigation of HRA's impact on college students' health behavior, Fultz (1977) reports, "The instrument provided initial motivation to change behavior in the desired direction; however, unless continuous input supporting the change was provided, the impact it carried in eliminating identified health risks began to diminish" (p. 98). Several other investigators have cited the importance of coupling HRA with specific individual/group risk reduction strategies for maximum disease prevention and health promotion benefits. These strategies encompass both educational programs dealing with specific risk reduction tactics and the creation of a supportive environment for positive health behavior change. As Hall and Zwemer (1979) report, "favorable changes in health behavior seem to be particularly pronounced when HHA [HRA] is linked to a dynamic group setting, to patient-prepared health contracts and to

personal follow-up" (p. 14).

In terms of risk reduction programs, HRA provides a way to set priorities for the health risks which must be addressed. This is invaluable for the primary health care provider in both individual and group settings. By weighing the various risks in an individual's HRA, sound decisions can be made about what types of health change to pursue first. Also, trends in HRA recommendations among specific populations aids in determining the types of risk reduction programs which are needed most for these groups.

In summary, HRA is beneficial not only in stimulating health behavior change but also in reinforcing current health promotion behavior. It also is a valuable tool in setting priorities for risk reduction needs in individuals and groups. For these reasons, HRA does seem to be a viable strategy for individual and group health promotion activities in nursing practice.

Recommendations

Continued investigation of the impact of HRA on health behavior is needed. Much of the research to date focuses on the use of HRA with older populations where chronic disease processes are well established. Health promotion efforts must place a greater emphasis on younger populations where primary prevention of disease can become a reality and health habits are more readily influenced. For these reasons, the following recommendations for further research are offered:

1. Replications of this investigation with larger probability samples are needed.

2. Longitudinal studies to measure the impact of HRA on health behavior over extended periods of time must be designed and implemented.

3. Within these longitudinal designs, provisions to assess morbidity and mortality rates among individuals exposed to HRA and risk reduction programs should be included. Such data would further validate the benefit of these health promotion efforts.

4. Further study of educational and environmental interventions to enhance and sustain the impact of HRA on health behavior are recommended.

Findings from these investigations will further address questions regarding the efficacy of HRA in health promotion and disease prevention strategies. Thus, research in the above-mentioned areas will contribute to the development of a scientific basis for individual, group, and community nursing interventions.

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APPENDIXES

APPENDIX A

HEALTH RISK APPRAISAL

IMPORTANT: To assure protection of your privacy, do NOT put your name on this form. Make sure that you put your Health Risk Appraisal "claim check" in your wallter or other safe place and insure that the number matches the number on this form. You must present your claim check to get your computer results.

PARTICIPANT NUMBER _____ 1-6

PLEASE ENTER YOUR ANSWERS IN THE EMPTY BOXES (use numbers only)

1. SEX [1] Male [2] Female 7

2. RACE [1] White (non-Hispanic origin) [2] Black (non-Hispanic origin) [3] Hispanic [4] Asian or Pacific Islander [5] American Indian or Alaskan Native [6] Other 8

3. AGE (AT LAST BIRTHDAY) Years Old 9-10

4. HEIGHT (WITHOUT SHOES) Feet and Inches (No fractions) ' " 11-13

5. WEIGHT (WITHOUT CLOTHES) Pounds 14-16

6. TOBACCO [1] Smoker [2] Ex-Smoker [3] Never-Smoked 17

If you are a smoker or ex-smoker enter average number smoked per day in the last five years. (Ex-smokers should use the last five years before quitting.)

Cigarettes Per Day	18-19
Pipes/Cigars Per Day (Smoke Inhaled)	20-21
Pipes/Cigars Per Day (Smoke Not Inhaled)	22-23

Enter Number of Years Stopped Smoking (Note: Enter 1 for less than one year) 24-25

7. ALCOHOL [1] Does Drink [2] Ex-Drinker (Stopped) [3] Never Drank 26

If you drink alcohol, enter the average number of drinks per week:

Bottles of beer per week	27-28
Glasses of wine per week	29-30
Mixed drinks or shots of liquor per week	31-32

8. DRUGS/MEDICATION How often do you use drugs or medication which affect your mood or help you to relax?
[1] Almost every day [2] Sometimes [3] Rarely or Never 33

10,000 = average

9. MILES Per Year as a driver of a motor vehicle and/or passenger of an automobile. Thousands of miles 0 0 0 34-38

10. SEAT BELT USE (Percent of time used) (50 = about half the time) 39-41

11. PHYSICAL ACTIVITY (Use your "Step-Test" level, if known, otherwise, estimate your activity level)
[1] Level 1 (Usually means little or no physical activity)
[2] Level 2 (Usually means occasional physical activity)
[3] Level 3 (Usually means Regular physical activity at least 3 times per week) 42

NOTE: Physical activity includes work and leisure activities that require sustained physical exertion such as walking briskly, running, lifting and carrying.

12. Did your parents die of a heart attack before age 60?
[1] Yes, One of them [2] Yes, Both of them [3] No [4] Not sure 43

13. Did your mother, father, sister or brother have diabetes?
[1] Yes [2] No [3] Not sure 44

14. Do **YOU** have diabetes?
[1] Yes, not controlled [2] Yes, controlled [3] No [4] Not sure 45

15. Rectal problems (other than piles or hemorrhoids). Have you had:

Rectal Growth?	[1] Yes	[2] No	[3] Not sure	46
Rectal Bleeding?	[1] Yes	[2] No	[3] Not sure	47
Annual Rectal Exam?	[1] Yes	[2] No	[3] Not sure	48

(Continued on other side)

16. Has your physician ever said you have chronic bronchitis or Emphysema?
[1] Yes [2] No [3] Not sure

17. Blood Pressure (If known – otherwise leave blank) Systolic (High Number)
Diastolic (Low Number)

18. Fasting Cholesterol Level (If known – otherwise leave blank) MG/DL

19. Considering your age, How would you describe your overall physical health?
[1] Excellent [2] Good [3] Fair [4] Poor

20. In general how satisfied are you with your life?
[1] Mostly satisfied [2] Partly Satisfied [3] Mostly Disappointed [4] Not sure

21. In general how strong are your social ties with your family and friends?
[1] Very strong [2] About Average [3] Weaker than average [4] Not sure

22. How many hours of sleep do you usually get at night?
[1] 6 hours or less [2] 7 hours [3] 8 hours [4] 9 hours or more

23. Have you suffered a serious personal loss or misfortune in the **Past Year**? (For example, a job loss, disability, divorce, separation, jail term, or the death of a close person)
[1] Yes, **One** serious loss [2] Yes, **Two or More** serious losses [3] No

24. How often in the **Past Year** did you witness or become involved in a violent or potentially violent argument?
[1] 4 or more times [2] 2 or 3 times [3] Once or never [4] Not sure

25. How many of the following things do you do?:
- Hitch-hike or pick up hitch-hikers
- Carry a gun or knife for protection
- Keep a gun at home for protection
- Regularly criticize or argue with strangers
- Live or work at night in a high crime area
- Regularly seek entertainment at night in high-crime areas or bars

[1] 3 or more [2] 1 or 2 [3] None [4] Not sure

26. Have you had a hysterectomy? (Women only)
[1] Yes [2] No [3] Not sure

27. How often do you have a Pap Smear? (Women only)
[1] At least once per year [2] At least once every 3 years [3] More than 3 years apart
[4] Have never had one [5] Not sure [6] Not applicable, had hysterectomy

28. Was your last Pap Smear Normal? (Women only)
[1] Yes [2] No [3] Not sure [4] Not applicable, had hysterectomy

29. Did your mother, sister or daughter have breast cancer? (Women only)
[1] Yes [2] No [3] Not sure

30. How often do you examine your breast for lumps? (Women only)
[1] Monthly [2] Once every few months [3] Rarely or never

31. Have you ever completed a computerized Health Risk Appraisal Questionnaire like this one?
[1] Yes [2] No [3] Not sure

32. Current Marital Status
[1] Single (Never married) [2] Married [3] Separated
[4] Widowed [5] Divorced [6] Other

33. Schooling completed (One choice only)
[1] Did **Not** graduate from high school
[2] High School [3] Some College [4] College or Professional Degree

34. Employment Status
[1] Employed [2] Unemployed
[3] Homemaker, Volunteer, or Student [4] Retired, Other

(SKIP IF NOT APPLICABLE)

35. Type of occupation
[1] Professional, Technical, Manager, Official or Proprietor [2] Clerical or Sales
[3] Craftsman, Foreman or Operative [4] Service or Laborer

APPENDIX B

PERSONAL HEALTH HABITS QUESTIONNAIRE

Diane Hanna, B.S.N., R.N.
Virginia Commonwealth University

1. How many hours of sleep do you usually get each night?

   _____ hours

2. How tall are you (without shoes)? _____ inches

3. How much do you weigh (without clothes)? _____ pounds

4. Which of the following describes your body frame?

   _____ small (narrow hips and shoulders) _____ medium _____ large (large hips and shoulders)

5. Do you smoke cigarettes?

   _____ yes

   _____ no, never

   _____ no, quit...When did you quit _____ (month & year)

6. How old were you when you began smoking? _____ years

7. If you are a smoker or ex-smoker, please complete the following (ex-smokers, please consider the last five years before quitting):

   Number cigarettes smoked per day _____

   Pipes/cigars smoked per day (smoke inhaled) _____

   Pipes/cigars smoked per day (smoke not inhaled) _____

8. Do you ever drink alcoholic beverages (including wine, beer, and/or hard liquor)?

   _____

9. If you drink alcohol, how many drinks per week do you average?

   Bottles of beer per week _____

Glasses of wine per week _____

Mixed drinks or shots of liquor per week _____

10. How many days a week do you eat breakfast? _____

What time do you usually eat breakfast? _____

What do you usually eat for breakfast? _____

_____

11. How many times do you eat between meals each day (excluding coffee, tea, diet drinks)?

_____ times

12. When in an automobile, what per cent of the time do you use a seatbelt or shoulder harness as a driver or passenger? (50% = half the time)

_____%

13. To estimate the amount of energy you expend on the average, please answer the following questions about physical activity with a typical day/week in mind. (Physical activity includes both work and leisure activities.)

a. How many flights of stairs do you climb per day? _____ flight(s)/day

b. How often do you engage in home repair or domestic/janitorial work around your home each week? _____ time(s)/week

How long does each session last? _____ minutes

c. How often do you engage in lawn mowing or outdoor gardening activities each week? _____ time(s)/week

How long does each session last? _____ minutes

d. How often do you take a walk or stroll each week? _____ time(s)/week

How long does each one last? _____ minutes

How vigorous are they? _____ mildly ____ moderately _____ very

e. How often do you run or jog each week? _____ time(s)/ week

How long does each session last? _____ minutes

How vigorous are they? _____ mildly ____ moderately _____ very

f. How often do you engage in calisthenics or exercises (including aerobics) each week? _____ time(s)/week

How long does each session last? _____ minutes

How vigorous are they? _____ mildly ____ moderately _____ very

g. On a weekly average, how often do you participate in any of the following activities: tennis, golf, softball, bowling, canoeing, horseback riding, folk dancing, volleyball, roller skating, bicycling _____ time(s)/week

How long does each session last? _____ minutes

h. On a weekly average, how often do you participate in any of the following activities: swimming, ice skating, handball/squash/racquetball, skiing (cross country or downhill), basketball, water skiing _____ time(s)/week

How long does each session last? _____ minutes

14. How often do you engage in centering, meditation, or other relaxation techniques? _____ time(s)/week

15. How often do you enage in other activities for relaxation (e.g., hobbies, entertainment)? _____ time(s)/week

16. How often do you seek the advice and support of others in dealing with personal concerns? _____ always ____ frequently ____ sometimes ____ rarely ____ never

17. In general, how have you been feeling during the past week? _____

_____

APPENDIX C

PARTICIPANT SCREENING FORM

1. What is your age? ___ Sex? ___ Male ___ Female

2. What is your occupation? _____

3. Do you have any health problems or physical disabilities for which you are currently being treated? _____

_____

_____

4. Are you presently undergoing any psychological counseling? ___ yes ___ no

5. Please list the highest level of formal education that you have completed. _____

Thank you.

APPENDIX D

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333

FEB 2 0 1981

[redacted]

Dear Ms. Hanna;

Mr. Ogden has asked me to respond to your January 30, 1981 letter. Your request for batch processing service for a Health Risk Appraisal trial at your university is approved. Your research proposal sounds quite interesting and we would appreciate a copy of your final report, when available.

When you are ready to submit your HRA's for processing, please have them key-punched onto standard IBM cards (one questionnaire per card) and send them to Dave Moriarty along with a note saying when you need the printouts sent back. We normally give a three to five day turnaround of batch processing requests.

Good luck, and give us a call if you need any additional help or have any further questions.

Sincerely yours,

[redacted]

Charles A. Althafer,
Director, Special Projects
Center For Health Promotion
and Education

APPENDIX E

COMMITTEE ON THE CONDUCT OF HUMAN RESEARCH APPROVAL FORMS

TO: Ms. Diane L. Hanna (Dr. Gloria Francis, Advisor) Principal Investigator

Dr. Phyllis Tyzenhouse Chairman of Department Concerned

Dr. Martha B. Conway Administrator of Research Grants & Contracts

TITLE OF INVESTIGATION: Exposure to the Health Hazard Appraisal and Health Promotion Activities.

VCU ASSIGNED NUMBER: 1/3I/81

The Committee on the Conduct of Human Research of Virginia Commonwealth University met on January 28, 1981, and the above investigation was reviewed and approved.

You are cautioned to note that:

1. Informed, written consent is required of each human subject or his legally qualified guardian or next-of-kin, unless specifically excluded.

2. Any deviation from the above named protocol, or the identification of unanticipated problems which may involve risk to subjects, must be reported to this committee for review and approval.

3. Your study is subject to continued surveillance by this committee, and it will be reviewed periodically. The next review is scheduled for January 1982. At that time you must make available to the committee a roster of all subjects, a file of the completed permission slips and a summary of the results obtained, especially any adverse or unexpected effects.

4. All requests for information related to this investigation must include the exact title, the investigator, and the VCU Study Number as noted above.

5. This investigation has been indentified as being submitted to the Department of Health, Education and Welfare, and will be certified to H. E. W.
Yes _____ NO X

6. In some instances approval is contingent upon compliance with changes designated by the committee. If such are imposed, they are listed on an attached sheet, one copy of which must be signed and returned to the committee to indicate the investigator's acceptance of the changes. Where there is no attachment, the study was accepted.

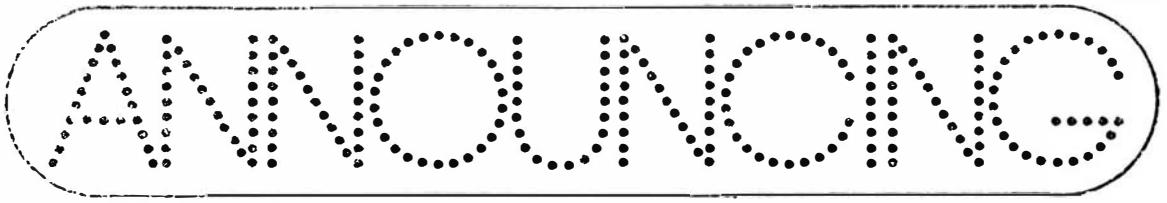
[redacted]

Donald L. Brummer, M.D., Chairman,
Committee On The Conduct of Human Research

DLB /ad

(Revised Form Dated 5/1/76)

APPENDIX F



WELLNESS PROGRAM FOR YOUNG ADULTS

As a part of her masters work in nursing, Diane Hanna is conducting a research study to gain a better understanding of how individuals can be assisted in preventing disease. Young adults between the ages of 18 and 39 are invited to take part. Partipants will be asked to complete two questionnaires covering information about their lifestyle and health. This information will be sent for computer analysis and individuals will receive their results in the form of a health risk profile. Private health firms charge anywhere from $5.00 to $25.00 to process risk appraisals such as these...this is your chance to have one done free of charge!

The investigation will involve two to three meetings -- each 30-45 minutes long to complete the forms and receive the printouts. All sessions will be held at Westover Hills United Methodist Church. Refreshments will be served and childcare provided. Diane is looking for at least 50 participants to complete this project, so bring your friends and come! Our first meeting wil be Sunday, March 1st at 7:00 p.m. in the parlor.

If you are interest in participating, please complete and return the form below, or call Diane at 359-1880 any evening after 8:00 p.m.

Name _____ Age _____

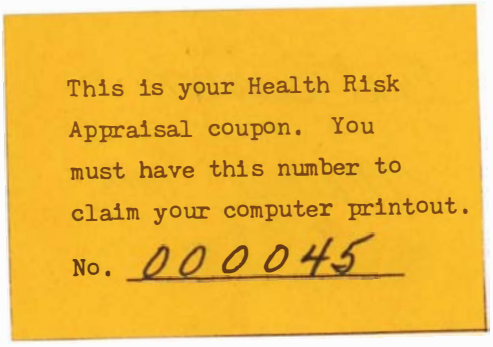
Address _____ Phone _____

Childcare services needed? if so, for how many? _____

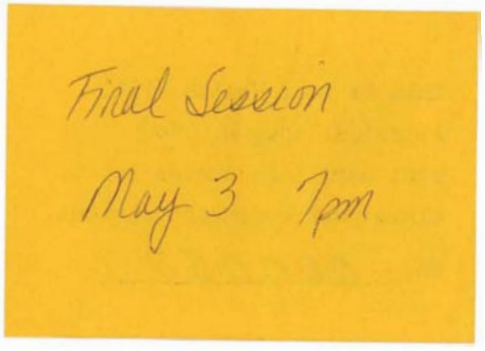
APPENDIX G

HEALTH RISK APPRAISAL COUPON

FRONT

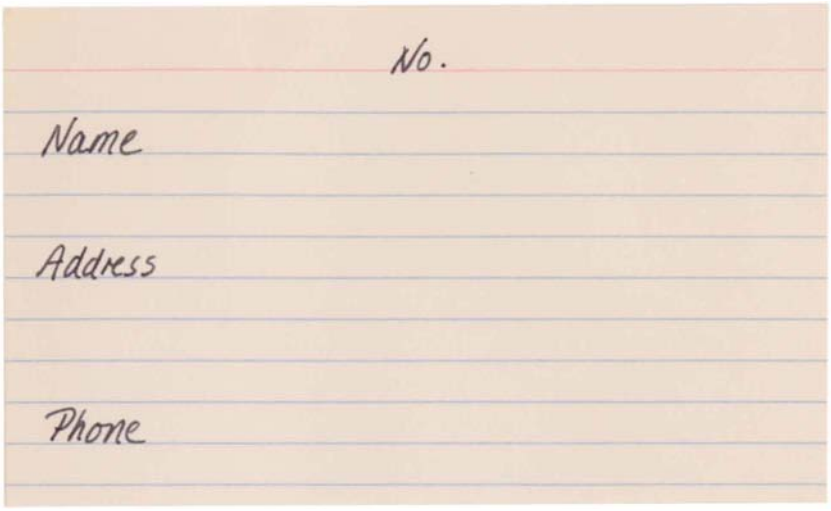


BACK



APPENDIX H

PARTICIPANT INFORMATION CARD



APPENDIX I

VOLUNTARY INFORMED CONSENT

I understand that Diane Hanna, a graduate nursing student at the Medical College of Virginia, Virginia Commonwealth University, is conducting a research study on promoting health in young adults. The purpose of the study is to gain a better understanding of how individuals can be assisted in preventing disease. I agree to participate by completing a health habits questionnaire and the Health Risk Appraisal which will be submitted for computerized analysis. I may be asked to attend a session discussing the results of this analysis.

I understand that I have the right to withdraw from this investigation at any time and can do so by notifying Ms. Hanna of this decision by phone or in person. I will not be affected by my refusal to participate. There is no risk involved in the investigation. It is also my understanding that all of the information collected in this study will be handled confidentially. My name will not be used in any reports of the investigation. The results of this research project will be available to me on request.

Signature _____

Witness _____
(other than investigator)

Date _____

APPENDIX J

000003

HEALTH RISK APPRAISAL
SHARE EMPLOYEE PROGRAM

DATE: 03/10/81

111

YOUR HEALTH RISK DATA HAVE BEEN ANALYZED AND THE RESULTS ARE SUMMARIZED BELOW AS THEY RELATE TO THE 12 MOST FREQUENT CAUSES OF DEATH FOR WHITE MALES AGED 40.

RANK	CAUSE OF DEATH	CHANCES OF DYING PER 100,000 WITHIN THE NEXT 10 YEARS			
		COL.1 AVERAGE	COL.2 APPRAISAL	COL. 3 ACHIEVABLE	COL.2-COL.3 DIFFERENCES
1	ARTERIOSCLEROTIC HEART DISEASE	1426	308	308	0
2	LUNG CANCER	323	64	64	0
3	CIRRHOSIS OF THE LIVER	294	588	294	294
4	SUICIDE	257	128	128	0
5	MOTOR VEHICLE ACCIDENTS	247	444	197	247
6	NON-MOTOR VEHICLE ACCIDENTS	235	235	235	0
7	STROKE	147	119	119	0
8	HOMICIDE	118	29	29	0
9	INTESTINAL CANCER INCL. RECTUM	83	67	20	47
10	PNEUMONIA	63	56	56	0
11	CHRONIC BRONCHITIS AND EMPHYSEMA	55	10	10	0
12	DIABETES	53	28	28	0
	ALL OTHER CAUSES	1277	1277	1277	0
	ALL CAUSES OF DEATH	4578	3353	2765	588

	ACTUAL	APPRAISED	ACHIEVABLE	DIFFERENCE
AGE:	40	36.8	34.7	2.1

168 LBS. IS APPROXIMATELY WHAT IT SHOULD BE FOR HEIGHT 76 INCHES AND SMALL OR MEDIUM FRAME.

********** COMPLIANCE **********

* AVERAGE CHANCES OF DYING ARE BASED ON 1975-1977 U. S. MORTALITY DATA. (CDC VERSION 1.1)
* APPRAISED AGE (OR "HEALTH AGE") IS AN ESTIMATE OF HOW HEALTHY YOU ARE COMPARED TO OTHERS OF YOUR RACE AND SEX.
* ACHIEVABLE AGE IS AN ESTIMATE OF HOW HEALTHY YOU COULD BE BY MAKING THE FOLLOWING CHANGES IN YOUR CONDITION/LIFESTYLE:

ALCOHOL FROM: 7-24/WEEK TO: 3-6/WEEK
RECTEXAM FROM: NO ANNUAL EXAM TO: ANNUAL EXAM AFTER 40

****

* NOTE -- HOMICIDE RISK IS PARTLY BASED ON HIGH-RISK ACTIVITIES INCLUDING USE OF WEAPONS, ENCOUNTERS WITH STRANGERS AND THE AMOUNT OF CONTACT WITH HIGH-CRIME AREAS.

* NOTE -- SUICIDE RISK IS PARTLY BASED ON ANSWERS TO QUESTIONS ABOUT PHYSICAL HEALTH, LIFE SATISFACTION, SOCIAL TIES, HOURS OF SLEEP, RECENT LOSS OR MISFORTUNE AND MARITAL STATUS.

CAUSE OF DEATH	CONDITION	APPRAISAL: AS APPRAISED	APPRAISAL: PARTIAL RISK	APPRAISAL: TOTAL RISK	ACHIEVABLE: ACHIEVED	ACHIEVABLE: PARTIAL RISK	ACHIEVABLE: TOTAL RISK
ARTERIOSCLEROTIC HEART DISEASE	DIABETES	NOT DIABETIC	0.9		NOT DIABETIC	0.9	
	WEIGHT	168	0.8		168	0.8	
	EXERCISE	RECOMMENDED	0.6		RECOMMENDED	0.6	
	SMOKING	NON-SMOKER	0.5		NON-SMOKER	0.5	
	FH/HEART	NO	1.0	0.22	NO	1.0	0.22
LUNG CANCER	SMOKING	NON-SMOKER	0.2	0.20	NON-SMOKER	0.2	0.20
CIRRHOSIS OF THE LIVER	ALCOHOL	7-24/WEEK	2.0	2.00	3-6/WEEK	1.0	1.00
SUICIDE	S-SCALE	BELOW AVERAGE RISK	0.5		BELOW AVERAGE RISK	0.5	
	ALCOHOL	7-24/WEEK	1.0	0.50	3-6/WEEK	1.0	0.50
MOTOR VEHICLE ACCIDENTS	ALCOHOL	7-24/WEEK	2.0		3-6/WEEK	1.0	
	MILES/YR	10000	1.0		10000	1.0	
	SEATBELT	75-100%	0.8	1.80	75-100%	0.8	0.80
STROKE	DIABETES	NOT DIABETIC	0.9		NOT DIABETIC	0.9	
	SMOKING	NON-SMOKER	0.9	0.81	NON-SMOKER	0.9	0.81
HOMICIDE	ARGUMENT	SAW OR IN 0-1/YEAR	0.5		SAW OR IN 0-1/YEAR	0.5	
	LIFESTYL	BELOW AVERAGE RISK	0.5	0.25	BELOW AVERAGE RISK	0.5	0.25
INTESTINAL CANCER INCL. RECTUM	RECT-GRO	HAS NOT HAD	0.9		HAS NOT HAD	0.9	
	RECTEXAM	NO ANNUAL EXAM	1.0		ANNUAL EXAM AFTER 40	0.3	
	RECT-BLD	NO BLOOD IN STOOL	0.9	0.81	NO BLOOD IN STOOL	0.9	0.24
PNEUMONIA	ALCOHOL	7-24/WEEK	1.0		3-6/WEEK	1.0	
	SMOKING	NON-SMOKER	1.0		NON-SMOKER	1.0	
	EMPHYSEM	DOES NOT HAVE	0.9	0.90	DOES NOT HAVE	0.9	0.90
CHRONIC BRONCHITIS AND EMPHYSEMA	SMOKING	NON-SMOKER	0.2	0.20	NON-SMOKER	0.2	0.20
DIABETES	WEIGHT	168	0.6		168	0.6	
	FH/DIAB	NO	0.9	0.54	NO	0.9	0.54

********** END **********

* RISK FACTORS ADAPTED FROM "HOW TO PRACTICE PROSPECTIVE MEDICINE",ORS. ROBBINS AND HALL, METHODIST HOSPITAL OF INDIANA.
* COMPUTER PROGRAM DEVELOPED BY THE CENTER FOR HEALTH PROMOTION AND EDUCATION, CENTERS FOR DISEASE CONTROL, DHHS. (V1.1,XY7)

NOTE: HEALTH RISK APPRAISAL IS STILL IN ITS EARLY STAGES OF DEVELOPMENT. ITS MAIN VALUE IS ITS POTENTIAL FOR SHOWING THE RELATIVE HEALTH RISKS ASSOCIATED WITH THE LIFESTYLE OF A PARTICULAR INDIVIDUAL. SINCE IT IS A DEVELOPMENTAL PROGRAM, IT SHOULD BE INTERPRETED BY A QUALIFIED HEALTH PROFESSIONAL.

--PLEASE NOTE-- THE ABOVE ANALYSIS IS INCOMPLETE DUE TO MISSING ANSWERS TO CERTAIN QUESTIONS.
THESE QUESTIONS CONCERN THE FOLLOWING CONDITIONS:
BP:SYST BP:DIAS CHOLESTR DRUG USE

APPENDIX K

HOW TO READ YOUR HEALTH RISK APPRAISAL

INTRODUCTION:

The objective of your Health Risk Appraisal is to help improve your survival potential. This is accomplished by indicating on the computer printout a personal program of risk reduction. This program advocates certain lifestyle changes and the adoption of periodic screening procedures. The success of Health Risk Appraisal rests on the popular professional opinion that the greatest influence on an individual's health is the cumulative effect of daily lifestyle decisions.

This printout has been prepared from the Health Risk Appraisal (HRA) questionnaire in which you described your health habits. It is relatively simple to read and understand. It will give you a check list which you can use to evaluate your own health habits and make changes which can lead to improving your chances for a longer, healthier life.

WHAT ARE THESE NUMBERS?

The computer has compared each of your habits with those of people who have died from specific causes. These comparisons will determine whether or not you are in danger of premature mortality from a particular cause. If you are, the computer has indicated which specific changes you should make in your health habits.

REMEMBER:

Conditions and health habits which lead to premature mortality are still under intensive study. However, although complete data are not always available, enough information is available for you to begin making changes in your lifestyle now. (1) The number at the top left hand corner of your computer pintout should be the same number that appeared on your questionnaire. This number allows you to identify your results and allows us to maintain strict confidentiality. (2) Below your identification number is the date your questionnaire was processed by the computer. The following are the points in the printout most basic to understanding your results:

1) Specific age groups
2) Compliance printout
3) Table I - "Chances of dying per 100,000 within the next 10 years"
4) Table II - "Detail Sheet"

1) Specific Age Groups

Example:

	ACTUAL	APPRAISED	ACHIEVABLE	DIFFERENCE
AGE:	57	60.8	55.8	5.0

Actual age is the age which you reported on the questionnaire. Appraised age or "health age" is an estimate of how healthy you are. It means that you stand the same chance of dying in the next 10 years as a person of this age. Achievable age or "compliance age" is an estimate of how healthy you can be after making certain changes in your lifestyle. These changes are listed in the compliance portion of the printout - i.e. after making these changes, you would stand the same chance of dying in the next 10 years as a person of your compliance age. The difference is the number of health years between your appraised and achievable ages, indicating potential for change.

2) Compliance Printout

Example:

HEALTH HABIT (FROM)	PRESENT HABIT (TO)	RECOMMENDED HABIT
EXERCISE FROM:	UNDESIRABLE TO:	SEDENTARY EXER. PGM
WEIGHT FROM:	195 LBS. TO:	176 LBS.
SEATBELT FROM:	25-74% TO:	75-100%
RECTEXAM FROM:	NO ANNUAL EXAM TO:	ANNUAL EXAM AFTER 40

If you change each of the habits listed, you will be able to bring your appraised age closer to the achievable age. Your weight is singled out also in the printout with an indication of how you compare with recommended weights from the Metropolitan Life Height/Weight Tables.

3) Table I - Chances of Dying Per 100,000 Within the Next Ten Years

Example:

		CHANCES OF DYING PER 100,000 WITHIN THE NEXT 10 YEARS			
RANK	CAUSE OF DEATH	COL. 1 Average	COL. 2 Appraisal	COL. 3 Achievable	COL.2-COL.3 Differences
1	Heart Attack	9194	17220	7281	9939

Col. 1 - Average: The numbers of people of your own age, race and sex group expected to die in the next ten years of a specific cause, e.g., if you are a 57-year-old male, this column will tell you that out of every 100,000 in the U.S., 9194 will probably die of heart attack within the next ten years.

Col. 2 - Appraisal: This column shows the number of people per 100,000 of your age, race and sex who have the same health habits as you, who are estimated to be at risk of dying from a specific cause in the next ten years. An estimated 17,220 57-year-old men who have theoretically the particular combination of undesirable exercise levels, no family history of heart disease or diabetes, and who have stopped smoking, are expected to die in the next ten years of a heart attack (per 100,000).

Col. 3 - Achievable: This is a number of people out of 100,000 of a specific age and sex who have changed certain health habits, who could be expected to die from a particular cause, e.g., if 57-year-old men can eliminate the health habits mentioned above, 7281 out of every 100,000 would die of heart attack in the next ten years.

Col. 2-Col. 3 - Differences: This figure is obtained by subtracting the mortality figures in the Achievable Col. 3 from those in the Appraisal Col. 2. It is simply the difference in number of expected deaths for people who have made changes in their health habits from the expected deaths for those who still have these health habits. You will note that there is a difference of 9939 in the two groups of males age 57, subtracting Col 3, from Col. 2.

Note: The causes of death for your particular group are placed in rank order in the lefthand column.

4. Table II - Detail

As the name suggests, the detail table describes specific changes which can be made in your health habits and shows exactly how each habit is related to a cause of death. The terms used here are Partial Risk and Total Risk.

Partial Risk is the value assigned to each health habit which leads to a major cause of death. All partial risks of 1.0 are "average." Numbers higher than 1.0 indicate higher than average risks; numbers lower than 1.0 (decimal numbers) indicate a lower than average risk. You should note that a particular habit may appear for more than one cause of death, e.g., smoking will contribute to a higher than average risk for heart attack, lung CA, disease of the arteries, stroke, and emphysema.

Total Risk is the combination of the Partial Risks. This gives a single risk value which includes all of your health habits, which may lead to mortality from one of the leading causes of death. The numbers are read the same as the Partial Risk. A risk value below 1.00 signifies that you are below average risk - pat yourself on the back!

Example:

* * *DETAIL* * *

CAUSE OF DEATH	CONDITION	APPRAISAL AS APPRAISED	APPRAISAL PARTIAL RISK	TOTAL RISK
Heart Attack	Diabetes	Not Diabetic	1.0	
	Weight	195	1.0	
	Exercise	Undesirable	2.0	
	Smoking	Stopped Smoking	0.9	
	FH/Heart	No	1.0	1.87

In this printout, the person described is not diabetic, is in high/normal weight range, and has no family history of heart disease. Each of these is assigned a Partial Risk of 1.0. Since he has stopped smoking, his Partial Risk is 0.9 (less than average); however, he has an undesirable exercise level which leads to a 2.0 value.

The Total Risk for heart disease is 1.87, which is somewhat higher than average.

The "Achievable" section of the detail table shows you what a breakdown of your risk profile would be if you changed the habits listed in the compliance section.

Example:

ACHIEVABLE

ACHIEVED	PARTIAL RISK	TOTAL RISK
NOT DIABETIC	1.0	
176	0.9	
SEDENTARY EXER. PGM	1.0	
STOPPED SMOKING	0.9	
NO	1.0	0.79

If this same person loses some weight, he would change the 1.0 Partial Risk to 0.9 and be more within the normal range. If he also begins to exercise regularly, he would change a risk of 2.0 to an average risk of 1.0.

These changes would change the Total Risk for heart disease from 1.87 to 0.79 (see the above examples) -- from an above average risk to a risk below average.

If you did not complete certain items on your risk appraisal questionnaire, (e.g., BP, cholesterol), the average values for your age-sex-race category were used in these areas to compile your HRA. A notation of this fact will appear at the bottom of your printout (below the Detail Table).

Summary

These are the most basic details for reading your HRA print-out.

THIS IS NOT INTENDED TO BE A COMPREHENSIVE MEDICAL ANALYSIS NOR A SUBSTITUTE FOR A MEDICAL EXAMINATION. It attempts to indicate some of the more common threats to your health and life over the next ten years, and it deals with probabilities, not certainties.

APPENDIX L

UNDERSTANDING YOUR HEALTH RISK APPRAISAL

PLEASE LOOK AT YOUR HEALTH RISK APPRAISAL PRINTOUT

The first thing you will notice is a large chart. It contains the following for your age/sex group.

CAUSE OF DEATH

The 12 leading causes of death are listed in rank order.

CHANCES OF DYING PER 100,000 WITHIN THE NEXT 10 YEARS

Col. 1 - AVERAGE - This column shows the number of expected deaths per 100,000 average people of your age and sex in the next 10 years.

Col. 2 - APPRAISAL - This column shows the number of expected deaths per 100,000 people who have the same medical history and lifestyle behaviors as you.

Col. 3 - ACHIEVABLE - This column shows the number of expected deaths per 100,000 people who have the same medical history and lifestyle behavior as you after you achieve the recommendations listed on the printout.

Col. 2 - Col. 3 - DIFFERENCES - This is the difference between your appraisal and achievable columns.

Below the chart you will notice 3 listed ages: actual age, appraised age, and achievable age. Immediately below the age information is your recommended weight, and under the section on COMPLIANCE are the recommended changes you need to make in order to reach your achievable age.

Page 2 of your Appraisal shows your specific conditions which affected your Health Risk Appraisal. The column headed PARTIAL RISK and TOTAL RISK is interpreted as follows:

For a number less than 1, your risk associated with your condition is less than the national average; number 1 is average risk; and a number more than 1 means you have a risk higher than the average risk for your age/sex group. A PARTIAL RISK is assigned to each condition or health habit; a TOTAL RISK is a combination of all partial risks for a particular disease.

Finally, please note at the bottom of page 2 a listing of any items not listed on your questionnaire. For these items, average normal values were used to calculate your Appraisal.

APPENDIX M

WELLNESS PROGRAM FOR YOUNG ADULTS

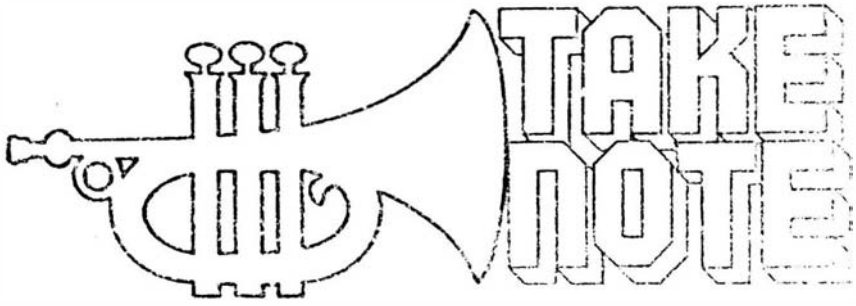
Our final session will be held on Sunday, May 3rd at 7 p.m. (in the Fellowship Hall of the Westover Hills United Methodist Church once again). As you arrive, you will be asked to complete one additional questionnaire. Also, personal Health Risk Appraisals will be distributed to those who have not yet received them. Refreshments will be served and free childcare services provided.

To conclude the program an excellent film on stress management provided by Blue Cross - Blue Shield of Virginia will be shown. Booklets on nutrition, fitness, stress management, health resources in Richmond, and other "wellness" related topics will be available for you to take. (The film is 35 minutes long and I plan to begin showing it at 7:30 p.m.).

Thanks again for your interest and support. If you have any questions, please give me a call at [redacted]

Sincerely,

Diane Hanna



COMPUTING THE HEALTH HABITS CHANGE SCORE

A health habits change score (HHCS) is derived by comparing an individual's health habits (as reported on the PHHQ) at two points in time. The questionnaire addresses personal health behavior in the following areas: sleep, weight, smoking, alcohol consumption, nutrition, seatbelt usage, exercise, and stress management. For each area, optimum health behavior believed to contribute to disease prevention and health promotion has been defined. These definitions are in keeping with current health promotion literature and CDC risk reduction recommendations. The HHCS reflects movement toward or away from these optimal behaviors as well as maintenance of health behavior (i.e., no change in behavior from pre- to posttest PHHQ).

It is important to remember that the HHCS reflects the direction and character of change in health behavior over time. Several possibilities for change on the continuum of negative health behavior to positive health behavior exist. For example, one could move from a negative health behavior to a health behavior that is less negative. A move from a negative health behavior to a more negative health behavior is also possible. The maintenance of the same positive health behavior reflects no change. Maximum improvement is seen when there is movement from a negative health behavior to a positive health

behavior. Here, negative health behavior refers to any health practices falling outside what has been defined as optimum health behavior. Positive health behavior includes all health practices that meet minimum standards for optimum health behavior. Thus, degrees of positive or negative health behavior are also possible, e.g., smoking one pack per day is a negative health behavior, but smoking five packs per day is more negative. On the other hand, jogging 15 minutes per day may be a positive health behavior, but jogging 30 minutes per day is even more positive.

With these possibilities in mind, the following scheme is used to score health behavior change:

Change Represented	Score
from NHB* to PHB* (maximum improvement)	+2
from PHB to more PHB (slight improvement)	+1
from NHB to less NHB (slight improvement)	
from PHB to PHB (no change)	0
from NHB to NHB (no change)	
from PHB to less PHB (slight decline)	-1
from NHB to more NHB (slight decline)	
from PHB to NHB (maximum decline)	-2

*NHB = negative health behavior

*PHB = positive health behavior

Now compare pre- and posttest PHHQ responses for the following areas and assign a HHCS using the scheme above:

PHHQ item(s)	Optimal Behavior
Sleep (#1)	7 to 8 hours sleep per 24 hours (no more, no less)[1]
Weight for Height (#2,3,4)	Desired weight for height using Metropolitan Life Insurance Height-Weight Tables (Appendix O)[2]
Smoking (#5)	Non-smoker[3]
Alcohol consumption (#8,9)	3 to 6 drinks per week or less[4]
Nutrition	
a. Breakfast consumption (#10) (see decision rule)	Eats breakfast every day[5]
b. Snacking (#11)	Eats two snacks per day or less[6]
Seatbelt usage (#12)	Uses seatbelts 75% of time or more[7]
Physical Activity (#13) (see decision rule)	Physical Activity Score $\geq$ 500[8] (see note)
Stress Management	
a. Relaxation activities (#14,15)	No. times/week for specific techniques (#14) plus no. time/week for other relaxation activities totals 7 or greater[9]
b. Use of supports(#16)	Always or frequently[10]

Once changes on the PHHQ items above have been scored, add these ten scores to derive the HHCS.

Note:

A Physical Activity Score (based on responses to PHHQ item #13) is computed for pre- and posttest questionnaires.

Activities requiring a mild level of exertion are considered Level 1, those requiring moderate exertion are Level 2, and vigorous activity is Level 3. Compute a subscore for questions a through h as follows:

a.) List number flights per day for subscore.

b.) This is a Level 1 activity. Multiply no. times per week by 1 for subscore.

c.) This is a level 2 activity. Multiply no. times per week by 2 for subscore.

d.) If response indicates activity is mildly vigorous, multiply no. times per week by 1 for subscore.

If response indicates activity is moderately or very vigorous, multiply no. times per week by 2 for subscore.

e.) If response indicates activity is mildly or moderately vigorous, multiply no. times per week by 2 for subscore.

If response indicates activity is very vigorous, multiply no. times per week by 3 for subscore.

f.) If response indicates activity is midly or moderately vigorous, multiply no times per week by 2 for subscore.

If response indicates activity is very vigorous, multiply no. times per week by 3 for subscore.

g.) These are Level 2 activities. Multiply no. times per week by 2 for subscore.

h.) These are Level 3 activities. Multiply no. times per week by 3 for subscore.

Physical Activity Score = Σ subscores a-g-h.

* Degree of vigor is based on number METS expended with each. See Fox et al. (1971) p. 427.

Decision Rules

The following decision rules must be observed when calculating the HHCS:

1. Sleep - Do not score changes between the ranges of 7-8 hours per 24 hours.

2. Weight - Changes in weight toward or away from the lower weight on the desired range are scored.

3. Alcohol consumption - If number of drinks per week remain below seven, change score is zero.

4. Breakfast - Breakfast is defined as any food taken from one or more of the Basic Four food groups after an extended period of sleep (traditionally upon rising in the morning) that provides part of the daily nutrient requirements and caloric value which literally "breaks the fast". The Basic Four includes the meat group, fruits and vegetables, milk group, and breads and cereals. "Other Foods" including unenriched refined breads, cereals, flours, sugars, butter, margarine, and other fats are not considered part of this Basic 4 (Robinson, 1975; Chaney et al., 1979; Goldsmith, 1982).

5. Snacks - Changes occurring within the range of 0 to 2 snacks per day are scored.

6. Seatbelt usage - Changes of 10% or more are scored.

7. Physical Activity Score - Only changes of 100 points or more are scored.

8. Stress Management

   a. Relaxation activities: Changes in totals over 7 are scored, as well as changes in Table below 7.

   b. Use of supports: If response changes between "always" and "frequently", change score is zero.

Footnotes

[1]from results of Belloc and Breslow (1972) study

[2]standard used by CDC's HRA

[3]standard used by CDC's HRA

[4]standard used by CDC's HRA

[5]from results of Belloc and Breslow (1972) study

[6]from results of Belloc and Breslow (1972) study

[7]standard used by CDC's HRA

[8]based on recommendations by CDC's HRA, Ardell (1977), and Blue Cross-Blue Shield's publication "Feel Better" (1974). Constance Gottwald, R.N. and fitness instructor also consulted in establishment of this scale. These recommendations were combined with a frequency distribution of scores of all participants to translate physical activity scores into levels of mild, moderate, or vigorous activity. Here, physical activity score of 0 - 499 are considered to represent mild levels, 500 - 1099 represents moderate levels, and 1100 and above represents vigorous levels of activity.

[9]based on Ardel (1977), Benson (1975), and Pelletier (1977)

[10]based on Ardell (1977), Pelletier (1977), and Blue Cross-Blue Shield publication "Stress" (1974)

APPENDIX O

Weight Tables*

Desirable weight tables are shown below for adult males and females. The tables assume height and weight taken with shoes and indoor clothing. The first set of tables shows desirable weight ranges for small frame, medium frame and large frame individuals. The second set of tables shows the percent over or under desirable weight for individuals of medium frame. In using the tables assume that small frame means thin chest, narrow shoulders and narrow pelvis, and that large frame means thick chest, broad shoulders and broad pelvis.

DESIRABLE WEIGHTS FOR MEN AND WOMEN AGED 25 AND OVER
(in pounds according to height and frame, in indoor clothing)

Height		Small Frame	Medium Frame	Large Frame
With 1 inch heels			MEN	
Feet	Inches			
5	2	112-120	118-129	126-141
5	3	115-123	121-133	129-144
5	4	118-126	124-136	132-148
5	5	121-129	127-139	135-152
5	6	124-133	130-143	138-156
5	7	128-137	134-147	142-161
5	8	132-141	138-152	147-166
5	9	136-145	142-156	151-170
5	10	140-150	146-160	155-174
5	11	144-154	150-165	159-179
6	0	148-158	154-170	164-184
6	1	152-162	158-175	168-189
6	2	156-167	162-180	173-194
6	3	160-171	167-185	178-199
6	4	164-175	172-190	182-204
With 2 inch heels			WOMEN	
4	10	92- 98	96-107	104-119
4	11	94-101	98-110	106-122
5	0	96-104	101-113	109-125
5	1	99-107	104-116	112-128
5	2	102-110	107-119	115-131
5	3	105-113	110-122	118-134
5	4	108-116	113-126	121-138
5	5	111-119	116-130	125-142
5	6	114-123	120-135	129-146
5	7	118-127	124-139	133-150
5	8	122-131	128-143	137-154
5	9	126-135	132-147	141-158
5	10	130-140	136-151	145-163
5	11	134-144	140-155	149-168
6	0	138-148	144-159	153-173

(*Courtesy of Metropolitan Life Insurance Co., New York)

Table—Percent Over or Under Desirable Weight for Females

Source: See table—Percent Over or Under Desirable Weight for Females.

Weight (pounds)	Height (inches)														
	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
80–84	−19	−21	−23	−25	−27	−29	−31	−33	−36	−38	−39	−41	−43	−44	−46
85–89	−14	−15	−19	−21	−23	−23	−27	−29	−32	−34	−36	−38	−39	−41	−43
90–94	−9	−12	−14	−16	−19	−21	−23	−25	−28	−30	−32	−34	−36	−38	−39
95–99	−4	−7	−9	−12	−14	−16	−19	−21	−24	−26	−28	−30	−32	−34	−36
100–104	0	0	−5	−7	−10	−12	−15	−17	−20	−22	−25	−27	−29	−31	−33
105–109	5	5	0	−3	−5	−8	−10	−13	−16	−19	−21	−23	−25	−27	−29
110–114	10	5	5	0	0	−3	−6	−9	−12	−15	−17	−20	−22	−24	−26
115–119	15	12	9	6	4	0	−2	−5	−8	−11	−14	−16	−18	−21	−23
120–124	20	17	14	11	8	5	2	0	−4	−7	−10	−13	−15	−17	−19
125–129	25	22	19	15	12	9	6	3	0	−3	−6	−9	−11	−14	−16
130–134	30	27	23	20	17	14	10	7	4	0	−3	−5	−8	−11	−13
135–139	35	32	28	25	21	18	15	11	7	4	0	−2	−5	−7	−10
140–144	40	37	33	29	26	22	19	15	11	8	5	2	0	−4	−6
145–149	45	41	37	34	30	27	23	20	15	12	8	5	2	0	−3
150–154	50	46	42	38	35	31	27	24	19	16	12	9	6	3	0
155–159	55	51	47	43	39	35	31	28	23	19	16	13	9	6	4
160–164	60	56	51	47	43	40	36	32	27	23	20	16	13	10	7
165–169	65	61	56	52	48	44	40	36	31	27	23	20	16	13	10
170–174	69	65	61	56	52	48	44	40	35	31	27	23	20	17	14
175–179	74	70	65	61	57	53	48	44	39	35	31	27	23	20	17
180–184	75	75	70	65	61	57	52	48	43	38	34	30	27	23	20
185–189	84	80	75	70	65	61	56	52	47	42	38	34	30	27	23
190–194	85	85	79	75	70	66	61	56	51	46	42	38	34	30	27
195–199	94	89	84	79	74	70	65	60	55	50	45	41	37	34	30
200–204	100	94	89	84	79	74	69	64	58	54	49	45	41	37	33
205–209	.....	100	93	88	83	78	73	68	62	57	53	48	44	40	37
210–214	.....	.....	98	93	88	83	77	72	66	61	56	52	48	44	40
215–219	.....	.....	100	97	92	87	82	76	70	65	60	56	51	47	43
220–224	.....	.....	.....	100	96	91	86	80	74	69	64	59	55	51	47
225–229	.....	.....	.....	.....	100	96	90	85	78	73	68	63	58	54	50
230–234	.....	.....	.....	.....	.....	100	94	89	82	76	71	66	62	57	53
235–239	.....	.....	.....	.....	.....	.....	98	93	86	80	75	70	65	61	56
240–244	.....	.....	.....	.....	.....	.....	100	97	90	84	79	73	69	64	60
245–249	.....	.....	.....	.....	.....	.....	.....	100	94	88	82	77	72	67	63

Table—Percent Over or Under Desirable Weight for Males

Note:—Blanks signify more than 100 percent overweight.

Source: Based on desirable weights (in ordinary clothing) for men and women of medium frame, at ages 25 and over, according to height (with shoes). Derived from tables in: New weight standards for men and women. Statistical Bulletin, Metropolitan Life Insurance Company 40: p. 3, November–December 1959, which were derived primarily from data of the Build and Blood Pressure Study, 1959, Society of Actuaries.

Weight (pounds)	Height (inches)														
	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
100–104	−17	−20	−22	−23	−25	−27	−29	−32	−33	−35	−37	−39	−40	−42	−44
105–109	−13	−15	−18	−20	−22	−24	−26	−28	−30	−32	−34	−36	−37	−39	−41
110–114	−9	−12	−14	−16	−18	−20	−23	−25	−27	−29	−31	−33	−35	−36	−38
115–119	−5	−8	−10	−12	−14	−17	−19	−21	−24	−26	−28	−30	−32	−34	−35
120–124	0	−4	−6	−8	−11	−13	−16	−18	−20	−23	−25	−27	−29	−31	−33
125–129	3	0	−2	−5	−7	−10	−12	−15	−17	−19	−22	−24	−26	−28	−30
130–134	7	4	0	0	−3	−6	−9	−11	−14	−15	−19	−21	−23	−25	−27
135–139	11	8	5	3	0	−2	−6	−8	−10	−13	−15	−18	−20	−22	−24
140–144	15	12	9	7	4	0	−2	−5	−7	−10	−12	−15	−17	−19	−22
145–149	19	16	13	11	8	5	0	0	−4	−7	−9	−12	−14	−16	−19
150–154	23	20	17	14	11	8	5	2	0	−4	−6	−9	−11	−14	−16
155–159	27	24	21	18	15	12	8	5	3	0	−3	−6	−8	−11	−13
160–164	31	28	25	22	19	15	12	9	6	3	0	−3	−5	−8	−10
165–169	35	31	28	26	22	19	15	12	9	6	3	0	−2	−5	−8
170–174	39	35	32	29	26	22	19	15	12	9	6	3	0	−2	−5
175–179	43	39	36	33	30	26	22	19	16	12	9	6	4	0	−2
180–184	47	43	40	37	33	30	26	22	19	16	12	9	6	3	0
185–189	51	47	44	41	37	33	29	26	22	19	15	12	9	6	3
190–194	55	51	48	44	41	37	32	29	25	22	19	15	12	9	6
195–199	60	55	52	48	44	40	36	32	29	25	22	18	15	12	9
200–204	64	59	55	52	48	44	39	36	32	28	25	21	18	15	12
205–209	68	63	59	56	52	47	43	39	35	31	28	24	21	18	14
210–214	72	67	63	59	55	51	46	42	39	35	31	27	24	20	17
215–219	76	71	67	63	59	54	50	46	42	38	34	30	27	23	20
220–224	80	75	71	67	63	58	53	49	45	41	37	33	30	26	23
225–229	84	79	75	71	66	62	57	52	48	44	40	36	33	29	25
230–234	88	83	78	74	70	65	60	56	52	47	43	39	36	32	28
235–239	92	87	82	78	74	69	63	59	55	50	46	42	39	35	31
240–244	96	91	86	82	77	72	67	62	58	54	49	45	42	37	34
245–249	100	94	90	86	81	76	70	66	61	57	52	48	44	40	36
250–254		98	94	89	85	79	74	69	65	60	56	51	47	43	39
255–259		100	98	93	88	83	77	72	68	63	59	54	50	46	42
260–264			100	97	92	86	81	76	71	66	62	57	53	49	45
265–269				100	96	90	84	79	75	70	65	60	56	52	48
270–274					99	94	88	83	78	73	68	63	59	55	50
275–279					100	97	91	86	81	76	71	66	62	57	53
280–284						100	94	89	84	79	74	69	65	60	56
285–289							98	93	88	82	77	72	68	63	59
290–294							100	96	91	85	80	75	71	66	61
295–299								99	94	89	83	78	74	69	64

Note—Blanks signify more than 100 percent overweight.

APPENDIX P

Appendix P

Health Risk Appraisal Suicide Scale (S-Scale)

The answers to 6 questions on the HRA questionnaire are used to compute whether the participant is an "above average," "average," or "below average" risk for committing suicide. A certain number of risk points are assigned for each answer. An average value is assigned for unanswered questions. The risk points are added together and the total is then compared to the table on the bottom of the page to determine which risk value to assign. The questions and risk points were primarily derived from a suicide risk scale developed by Calvin Frederick at the National Institute of Mental Health.[1]

Suicide Rating

Q.19 Physical Health - corresponds to "medical status" on Frederick scale.

		Points
1.	Excellent	1
2.	Good	2
3.	Fair	3
4.	Poor	5
5.	Other answers	3

Q.20 Life Satisfaction - relates to several Depression items on Frederick scale - "behavior symptoms," "agitated mood," "self-blame," and "personal interaction."

1.	Mostly satisfied	1
2.	Partly satisfied	5
3.	Mostly disappointed	9
4.	Not sure	5
5.	Other answers	5

Q.21 Social Ties - corresponds to "personal resources" and "personal interaction."

1.	Very strong	2
2.	About average	5
3.	Weaker than average	8
4.	Not sure	5
5.	Other answers	5

Q.22 Hours Sleep - relates to "behavior symptoms."

		Points
1.	6 hours or less	4
2.	7 hours	2
3.	8 hours	2
4.	9 hours or more	4
5.	Other answers	3

Q.23 Loss or Misfortune - relates to "stress" and "rejection" on Frederick scale.

1.	Yes, one loss	6
2.	Yes, two or more	9
3.	No	3
4.	Other answers	5

Q.32 Marital Status - corresponds to "marital status" on Frederick scale.

1.	Single	2
2.	Married	1
3.	Separated	4
4.	Widowed	5
5.	Divorced	4
6.	Other answers	3

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Above average risk	27 - 40 points
Average risk	18 - 26 points
Below average risk	10 - 17 points

[1] Frederick, C. J., Johnson, W.R. (Ed); "Health in Action"; pgs 394-5; Holt, Rinehart and Winston, New York: 1977

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APPENDIX Q

INDIVIDUAL HEALTH PROFILES FOR EXPERIMENTAL SUBJECTS

	SUBJECT NUMBER														
	2	4	6	8	10	12	16	18	20	22	24	26	28	30	36
Sleep (#1)	0(-)	0(+)	0(+)	-2	0(+)	0(+)	+1	+2	+2	+1	+2	0(+)	0(+)	-2	0(+)
Weight for Height (#2,3,4)	+1	0(+)	0(+)	+2	+1	0(-)	0(-)	0(+)	0(-)	0(+)	0(+)	+1	-1	1	0(+)
Smoking	0(+)	0(+)	0(+)	0(+)	0(+)	0(-)	0(+)	0(+)	0(+)	0(+)	0(+)	0(+)	0(+)	-2	0(+)
Alcohol Consumption (#8,9)	0(+)	0(+)	0(+)	0(+)	0(+)	0(--)	0(+)	0(--)	0(+)	0(+)	+2	0(+)	0(+)	0(+)	0(+)
Breakfast (#10)	+1	+1	0(+)	0(+)	-1	0(-)	+1	+1	+2	0(+)	-1	+1	+1	0(+)	0(+)
Snacking (#11)	0(	+1	-1	-1	+1	0(-)	0(+)	0(+)	0(+)	+1	0(+)	0(+)	0(+)	0(+)	0(+)
Seatbelt Usage (#12)	0(+)	0	+1	+1	+1	0(-)	+1	-1	+1	+1	+1	+2	-1	+2	0(-)
Physical Activity (#13)	+1	-1	-2	+2	+2	-1	+2	+2	+2	-2	-1	0(+)	-2	0(+)	-1
Relaxation Activities (#14,15)	+2	-1	-1	+1	-1	+2	0(-)	0(-)	-1	-1	-1	-2	-2	-1	-2
Use of Supports (#16)	0(+)	0	0(-)	+1	0(-)	+1	-1	+1	0(+)	0(-)	-2	0(+)	0(+)	+2	0(+)
Total Change Score	+5	0	-3	+4	+3	+2	+4	+5	+6	0	0	2	-5	0	-3

Note: (+) or (-) after zero indicates maintenance of positive health behavior or negative health behavior.

INDIVIDUAL HICS PROFILES FOR CONTROL SUBJECTS

	SUBJECT NUMBER														
	1	5	7	9	13	15	17	19	21	23	25	27	29	31	33
Sleep (#1)	0(+)	0(+)	-2	+2	+2	0(-)	0(+)	-2	+2	0(+)	-2	0(+)	+2	0(-)	0(+)
Weight for Height (#2,3,4)	0(+)	0(-)	+1	+1	-1	0(+)	0(-)	+2	+1	-1	-1	-1	-1	0(+)	-1
Smoking (#5)	0(+)	0(+)	0(+)	+1	0(+)	0(+)	0(+)	0(+)	0(+)	0(+)	0(+)	0(+)	-2	0(+)	0(+)
Alcohol Consumption (#8,9)	0(+)	0(+)	+2	0(+)	0(-)	0(+)	0(-)	0(+)	0(+)	0(+)	+1	0(+)	0(-)	0(-)	0(+)
Breakfast (#10)	0(-)	0(+)	0(-)	0(-)	-1	-1	0(-)	0(+)	0(+)	0(-)	0(+)	0(-)	0(-)	0(+)	0(-)
Snacking (#11)	0(-)	+2	0(+)	0(-)	+1	+1	+1	+1	-2	0(+)	-1	+1	0(+)	+1	0(+)
Seatbelt Usage (#12)	+1	+1	-1	0(-)	+1	0(-)	+2	+1	0(-)	0(-)	0(+)	-1	+1	+1	0(+)
Physical Activity (#13)	+1	0(+)	0(+)	-1	+1	-2	0(+)	-1	-1	0(+)	-1	0(-)	+1	+1	-1
Relaxation Activities (#14,15)	-2	-2	-1	-1	-1	-1	-1	-2	-1	-2	+2	-1	-2	0(-)	+2
Use of Supports (#16)	0(-)	-2	-1	0(+)	0(-)	0(+)	-2	+1	0(-)	0(-)	+1	0(+)	-2	-2	0(-)
Total Change Scores	0	-1	-2	+2	+1	-3	2	0	-1	-3	-1	-2	-3	+1	0

Note: (+) or (-) after zero indicates maintenance of positive health behavior or negative health behavior.

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